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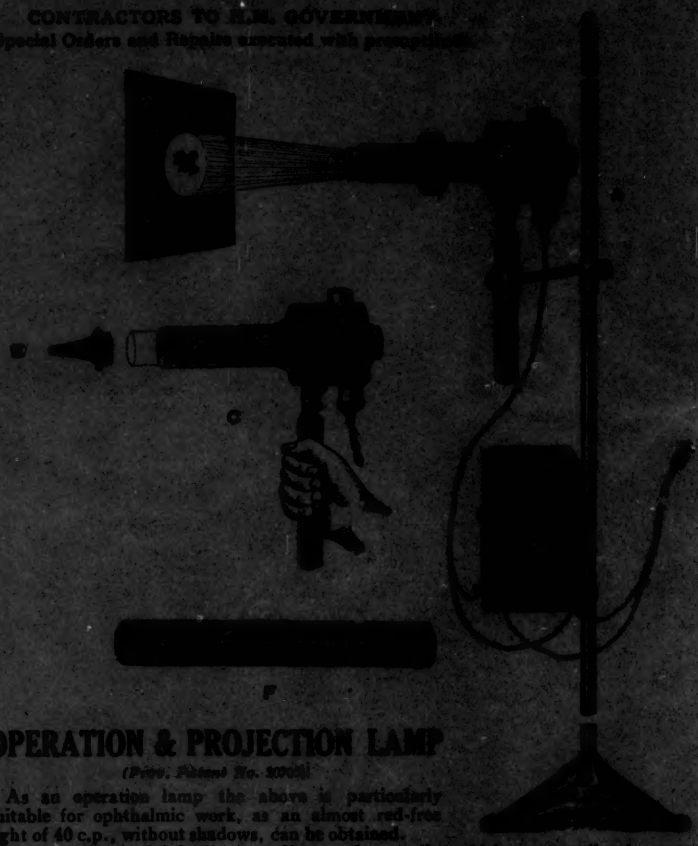

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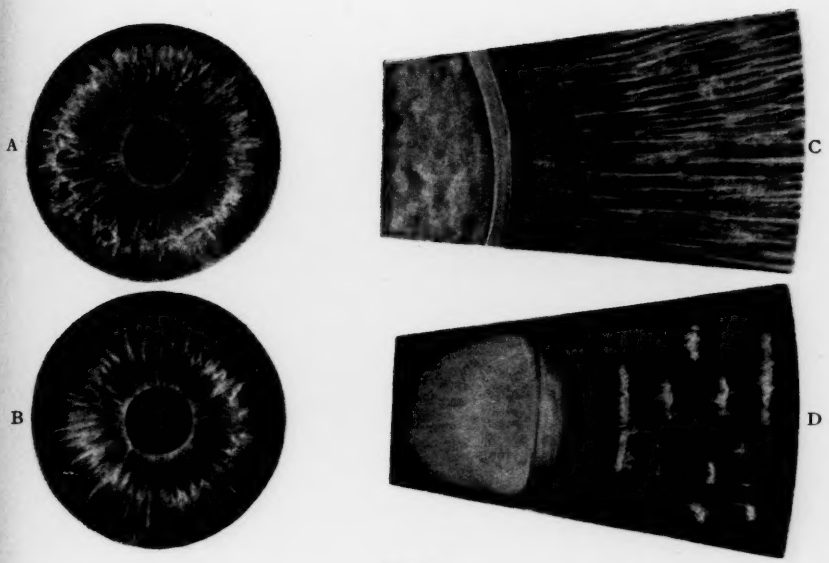

FIG. 5

Mr. D. A. Heterochromic cyclitis right eye. B. Normal left eye of same patient. The diagram shows atrophy of the superficial layer of the iris, and none of the retinal pigmented layer.
Mrs. C., age 56. Heterochromic cyclitis. Fig. C shows the iris examined by direct illumination. The sphincter iridis is evident and there is obvious atrophy of the superficial layers. Fig. D shows the same iris under retro-illumination showing numerous large defects in the retinal layer.

FIG. 9.

A. H., age 33. V=<6/60 V<6/60. Subluxation left lens. Partial aniridia, the greater part of the anteror iris layers absent. Mere tags of suspensory ligament. The second diagram shows membranes in the vitreous on which are specks of pigment. All seen with loupe and point o' light.

FIG. 14.

W. F., age 42. ***Cataracta coerulea punctata***, abnormal type. A case of legal interest. The eye was said to have been punctured by a copper wire. The central cataract, greenish in colour, was ascribed to the puncture. Its position, on the surface of the adult nucleus, negatived this theory. A few blue deposits were visible deeper in the lens, and the other eye showed deposits of cataracta coerulea, but less regular and small in amount. The corneal scar was superficial.

FIG. 23.

Pigment " stars " seen with loupe on anterior capsule.

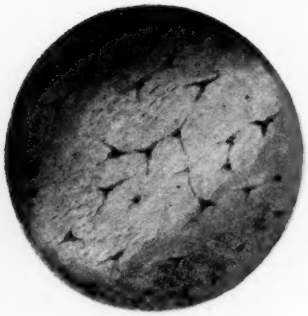

FIG. 24.

The same under a magnification of 35 diameters.

FIG. 38.

Mr. S., age 30. Followed up for 9 years. Progressive.

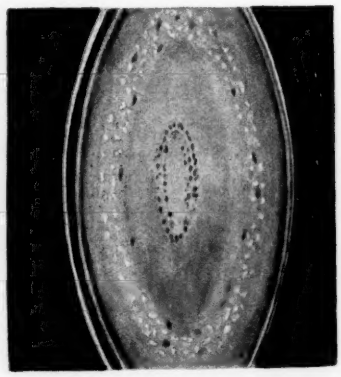

FIG. 39.

Cataracta coerulea.

THE BRITISH JOURNAL
OF
OPHTHALMOLOGY
DECEMBER, 1924

COMMUNICATIONS

THE DOYNE MEMORIAL LECTURE, 1924*

BY

T. HARRISON BUTLER

BIRMINGHAM

Focal Illumination of the Eye with special reference to the clinical use of Gullstrand's Slit-Lamp.

[After expressing his thanks for the honour conferred upon him the lecturer proceeded:]

I render homage to Robert Doyne our founder and first Master. The Oxford Ophthalmological Congress is a lasting tribute to the foresight and breadth of mind of him who gave it birth, and it is no exaggeration to say that by its conception Doyne kindled a torch which not only sheds its rays within its immediate range but diffuses its radiance to remote corners of the earth. I would that he were here with us to-day for I know that he with his unrivalled powers of accurate observation would have taken full advantage of the instruments that we are about to discuss.

The primeval savage who in the far distant stone age held a splinter of blazing pine to his comrade's eye to search for a fragment of flint was the parent of *oblique illumination*, a method which, starting in such simple wise, culminates to-day in that triumph of optical art, Gullstrand's slit-lamp.

* Read at the Meeting of the Oxford Ophthalmological Congress.

History does not relate the name of the sage who first used a lens to concentrate the light of a candle upon an eye. Whoever he may have been, we can credit him with the invention of *focal illumination*.

By focal illumination I understand the power to throw a beam of light into the eye and to concentrate it upon any point in a punctal or linear focus. This is the antithesis of illumination with a diffuse light.

The use of a candle or oil lamp preserved some approach to a punctal focus, and it is probable that the many discoveries made in the early part of the 19th century in respect of the pathological and normal conditions of the anterior segment of the eye are partly due to the fact that our forefathers quite innocently made some use of the focal method. The introduction of the Argand burner and of the incandescent electric lamp tended to a more diffuse light and retarded progress.

The ability to concentrate upon the eye a beam of light whether in pencil or ribbon form has many advantages over the use of a diffuse light from a lateral source. Many of us, long before we realized the full value of the focal beam, instinctively found that we obtained a clearer view of the cornea and iris if we removed our lamp to a distance. Couper in the 19th century taught his pupils not to place the lamp close to the lens; he was striving after focal illumination.

The superiority of focal illumination is due to several factors which we may analyze with benefit, for a clear conception of the merits of a punctal focus will enable us the better to appreciate the possibilities of the slit-lamp, and to use it to the best advantage. In the first place a focused light, however powerful, is not nearly so dazzling as diffuse illumination. It is possible to examine a patient with an inflamed photophobic eye with the narrow ribbon of the slit-lamp who could not tolerate diffuse light of an intensity sufficient to reveal necessary detail.

A pupil which contracts strongly to diffuse light will remain sufficiently dilated for us to examine the lens with the slit-lamp beam. So tolerant is the pupil to focused light that I have made by far the majority of my slit-lamp examinations with an undilated pupil, and such have included the vitreous.

Few of my patients, aged and young, have raised objection, or manifested discomfort, when examined by this apparatus, so long as a definite time limit was not exceeded, a limit which varies greatly with different individuals.

A good example of the dazzle caused by diffused light is known to most of us. If we sit round the fire in the twilight till we have become dark-adapted, and then proceed to light a pipe, the stimulation caused by the intermittent flare of the match is almost

unbearable if the eyes be closed, but quite tolerable with them open. Another example is the well-known intolerance of bright light exhibited by patients with complete cataract. Secondly a focused beam of light has greatly enhanced penetrating power as compared with diffuse illumination. Quite recently I examined a patient with old-standing interstitial keratitis and semi-opaque corneae. Using for oblique illumination a so-called focus-bulb I could see nothing beyond the cornea. I then switched on a 100 candle-power gas-filled lamp in the ceiling of my dark-room, and concentrated the light with an ordinary lens upon the eyes. I was at once able to see that in one eye the pupil was occluded and very small, that the other pupil was free from exudate, and that the posterior layer of the iris round the pupil margin was atrophic.

The high penetration of the focal beam enables us to examine the whole of the lens, the anterior third of the vitreous, and, with special arrangements, the entire vitreous and the retina.

A further advantage of the focused pencil lies in the fact that we can use five methods of illumination. By advancing our lens and throwing the beam out of focus we obtain ordinary *diffuse oblique illumination*. We can focus upon the object under observation and see it in reflected light, *direct illumination*. We can throw the focus beyond our object and view it by light reflected from behind, by what Graves very aptly calls *retro-illumination*, examination by transmitted light. Thus we can observe the cornea in light reflected from the iris, a property we minimize if we dilate the pupil. We can see the iris in lens light, and the anterior part of the lens can be illuminated by light from the posterior capsule. The ability to examine the transparent parts of the eye by transmitted light, and by an alternation of reflected and transmitted light is of great value. Fine changes and minute objects invisible by direct illumination are revealed by retro-illumination, and their more intimate structure laid bare by the alternating method. Retro-illumination is especially useful for the differentiation of deposits upon the back of the cornea, for detecting oedema both of the epithelium and the endothelium, and for examining the actual circulation of the blood in corneal and limbal vessels. Its value in the examination of the iris will be mentioned later.

Focal illumination allows us to utilize the method of examination in *specular* or *mirror light*, demonstrating the endothelial cells of the cornea, the lens shagreen with its epithelial cells, the lens figures and sutures, and the posterior lens shagreen. The fifth method, which we may call *sclerotic scatter*, will be described later in this paper.

Finally, focal illumination allows us to make an accurate *estimation of the position* of an object within the eye both as regards depth and lateral situation. Accurate localization is

possible only with the slit-lamp, but in a lesser degree can be attained by simpler methods of focal illumination.

Localization. — The stereoscopic image furnished by the binocular microscope enables us to localize roughly by mere inspection. The micrometer eye-piece affords a ready means of localization upon a vertical bilateral plane. Thus we can measure by the micrometer the distance between punctate opacities in the cornea, or the lateral extent of larger deposits. Measurements can be made of the relative position of objects along the optical section both in the cornea and lens. This reading can be reduced to an actual depth measurement by measuring the angle between the axes of the lamp and the microscope, and solving the triangle by the usual tables. A correction must be made for refraction. Vogt, using this method, has made accurate determination of the thickness of the various lamellae of the lens, and has obtained useful information regarding its growth.

The focusing screw of the microscope is fitted with Ulbrich's micrometer drum, a slip-ring which records in tenths of a millimetre the travel of the tube along the slide. This, corrected for refraction, gives the distance between any two objects successively focused.

These methods are somewhat academical and take up time, but fortunately we possess another which gives a relative localization sufficiently accurate for all clinical purposes. If the lamp be moved in such wise that the beam of light crosses the object we wish to localize we can at once see what part of the beam first lights up the object. Thus if in the cornea the object is first lighted by the posterior edge of the prism of light formed by the beam in the cornea it is on the endothelium. Using this method we can at once say that an object is on the epithelial surface, at different positions within the stroma, or on the endothelial surface. Under a magnification of twenty-three the projected aspect of the section of the cornea is about three-quarters of a centimetre across and affords sufficient space for considerable accuracy in localization. A lucid account of this method will be found in the March number of THE BRITISH JOURNAL OF OPHTHALMOLOGY, 1924. (Translated from Vogt.)

We can attain focal illumination either by the simplest means at the command of every surgeon, or by the use of more or less complicated apparatus.

For various and obvious reasons the slit-lamp will not be our sole source of the focal beam. It cannot be carried about, and in many cases its high initial cost precludes its use. Fortunately many of the properties conferred by the slit-lamp can be attained in a modified but still efficient form at no great expense. It is for this reason that the subject of this lecture was not confined to the *slit-lamp* but embraces the whole aspect of *focal illumination*.

The humblest and yet very efficient source of focal illumination is the ordinary 40-watt gas-filled bulb, the so-called "half-watt" lamp. Even better is a small motor-car bulb with a thick short filament. This runs at a low voltage and needs a resistance if the current is taken from the town supply. I am now using with great satisfaction the small operating lamp made by Rayner and Keeler. I remove the lens system, and with the lamp alone I get a really good clean shaft of light. A similar lamp made by Hamblin is equally effective.

If we use the half-watt lamp it must be located at a distance of about three feet for the 40-watt and eight feet for the 100-watt. It must be so placed that the plane of the ring-shaped filament lies in the plane of a line joining the bulb to the eye. By this arrangement we eliminate the circle and project a line of light. Focused upon the cornea the filament gives a crenellated line. A similar line can be focused upon the anterior capsule and a beam of light thrown into the interior of the eye. A third focus forms a mirror upon the posterior capsule. The Rayner lamp can be fitted with a slit and then it gives a fair ribbon, but I find it more practically useful without this attachment.

It will be advantageous to describe what can be attained with these simple methods of focal illumination, as regards localization, the examination of the cornea, the anterior chamber, the iris, the lens and the vitreous.

Localization.—If we focus the light upon the cornea we shall see a second mirror upon the anterior capsule. The length of the dark interval between the two is a measure of the depth of the anterior chamber.

If we see any opacities in the lens we move the beam or shaft of light from side to side and note what portion of its length first illuminates the opacity. If the opacity, for example, is illuminated first by the mirror or light formed by the posterior capsule we have an opacity in or near that structure. An anterior capsular opacity will flash into view at the same level as the illumination on the iris. We can by this means say with certainty that the opacity is near the anterior capsule, near the posterior capsule, or within the substance of the lens. I think that in most cases this is the limit of our power. More accurate localization needs the slit-lamp.

Cornea.—We must first examine the cornea by ordinary oblique illumination. This can be done efficiently with the half-watt by pushing in the condensing lens till the light is out of focus. We get a far more effective light than with an ordinary frosted bulb. We now direct the beam into the limbus, and obtain what Graves calls *sclerotic scatter*. The light passes along the cornea by

alternate reflection from the anterior and posterior surfaces and strongly illuminates the limbus at the opposite side (see Fig. 7). The cornea itself glows with internal light, and small and tenuous opacities spring clearly into view. These can be more minutely examined by directing the focus first upon them and then upon the iris, which for this purpose should not be under the influence of a mydriatic. We thus can see opacities and foreign bodies by alternate direct and retro-illumination. Many small objects invisible by direct light are easily seen by transmitted light. The presence of fine deposits upon the endothelium, "K.P.," can be best detected by retro-illumination.

The Blood Circulation can be seen under certain favourable conditions by the light from a simple source and the ordinary loupe which magnifies about six times.* It is useful to attempt to see it, for it forms the best test of perfect application of the methods I am describing. Choose a case with vascularization of the cornea, such as a fascicular ulcer, and with a yellowish iris. Throw the light upon the iris in such wise that it is reflected back to the observing eye traversing the vessel under review. When the eye has become fully dark-adapted and the lens focus is absolutely sharp the blood column in the vessel will appear segmented in the smaller vessels. After a time it can be noted that the segments have changed their place although no actual movement has been seen. About this time we observe that the blood stream in a larger vessel has become moniliform, and then quite suddenly and for no apparent reason a rapid streaming is seen in the vessels. It is much more difficult but possible to obtain the same appearance in an ordinary limbal vessel, but it calls for the most meticulous care in adjusting the focus of light and loupe, and it is possible that it may even demand unusual visual acuity. Focus the light upon the sclera close to a conjunctival vessel choosing a long thin vein, and wait patiently till the phenomenon appears. It is probable that no one will succeed with the limbal vessels till he has a clear conception formed by observation with the slit-lamp of what he is looking for. On the other hand, in a case of pannus it may be comparatively easy. One of my house surgeons who had never seen a slit-lamp was able to see the phenomenon and accurately to describe to me what he saw. In another apparently similar case the circulation cannot be seen, but the same is true with the slit-lamp. I have even seen the circulation in daylight in a leash of vessels supplying a healed traumatic ulcer.

* This phenomenon was first seen with a loupe in 1888 by Dr. H. Friedenwald, now of Baltimore, U.S.A.. *Centralblatt fur praktische Augenheilkunde*, February, 1888. Coccius in 1852 examined the limbal vessels with a system of lenses and saw the circulation.

Anterior Chamber.—Focal illumination with simple apparatus will render useful service in the anterior chamber, but in this respect it gives results far less valuable than the slit-lamp. As I have stated, when a focal beam is thrown into the eye it makes a mirror on the cornea and a second on the anterior capsule. The beam glows in the lens and is faintly relucent in the vitreous. This appearance is shown in Fig. 1, a slit-lamp picture. The

FIG. 3.

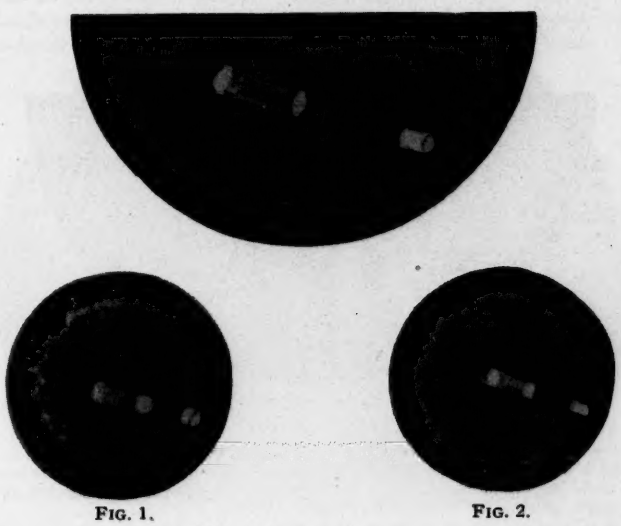

FIG. 1. FIG. 2.

Fig. 1 shows the pencil of light from the slit-lamp traversing the anterior chamber. Fig. 2. The same pencil crossing an albuminous aqueous. Fig. 3. Particles glistening across the pencil in the anterior chamber.

aqueous is perfectly dark. In a case in which the aqueous is albuminous it renders the beam visible as in Fig. 2.

If the shaft of light passes from the corneal surface to the posterior capsule showing no change of luminosity between the two mirrors of light, then it is obvious that there is no alteration of optical quality in the media through which it passes. Either the lens touches the back of the cornea or the anterior chamber is full of vitreous, or of highly albuminous aqueous. Fig. 4 illustrates a case of this kind. The eye had sustained a severe blow causing subluxation of the lens. To the left, the iris has become infolded and the ciliary processes are visible. The lens itself is tilted backwards as on a hinge on the right side. The focal beam, in this case from a point o'light lamp, forms a mirror on the cornea and another on the posterior surface of the lens. There is no break in

the continuity or alteration in the luminosity of the shaft of light. We were able to see that the lens was pushed backwards in this situation so it was obvious that the vitreous had come forward and filled the anterior chamber. The red streaks on the periphery of the lens indicate the spots where the suspensory ligament has been torn away. The condition was equally evident when examined with a half-watt lamp. It is often of great value to know that the vitreous has entered the anterior chamber, as for example after a discission, and in at any rate some cases the diagnosis can be made with a half-watt lamp and loupe. With the slit-lamp and corneal microscope the diagnosis is much more certain for

FIG. 4.

Traumatic dislocation of lens backwards on left side showing vitreous in the anterior chamber giving an unbroken shaft of light from the cornea to back of lens. Cyclitic membrane showing striations which appear to be thickened suspensory ligament fibres. Haemorrhages on lens possibly at site of attachment of suspensory fibres. Visible ciliary processes.
NOTE.—Lens has no bright or dark edge as it has vitreous in front of it. Lens tilted.

we can detect small localized hernias of the vitreous which, as Vogt points out, are not uncommon after operations upon the lens capsule.

Iris.—The iris consists of three layers: the posterior pigmented layer derived from the secondary optic cup, and the two superficial mesodermic layers. These latter may be fused together, but in most cases the superficial leaf ceases at a spot about one-third of the distance from the periphery to the pupil margin. Here we find a well-defined thickened line, the *Krause* of the Germans. As we have no convenient term for this important line I propose to call it the "frill." The circulus iridis minor is found here. In general the connections between the two mesodermic layers are very loose and the outer layer takes little part in the movements of the iris. As a result when the pupil is dilated the frill lies close to the pupil margin. The space between the two is often very

evident when we examine it with the slit-lamp. It is called the *cleft of Fuchs*. The outer leaf may be absent over large areas and often has large holes through which we can see the deeper and darker layers. A case has been recorded in which it became completely detached and floated free in the anterior chamber.

In cases of heterochromic cyclitis the outer leaf becomes atrophic, in others the pigment layer is atrophied. Fig. 5 (see coloured plate) shows an early case of this disease. The superficial leaf of the iris is atrophic, but there is no evidence of any change in the retinal layer. In *Figs. 5C and 5D, we have a case in which the

FIG. 6.

Atrophy of iris and pupil ruff. Focal illumination with half-watt lamp and ordinary condenser. Case of chronic iritis.

pigment layer is full of holes and tears. The superficial layer is also atrophic. It would appear that the superficial layer suffers first, but I have not examined a sufficient number of cases to be sure on this point.

We have no name for the pupil margin nor for the ruff of uveal tissue which surrounds it. I shall call the prominences round it the "*mamelons*," using the French word. The *mamelons* are larger in the upper half of the pupil, and we may find a double row. They are more developed in the horse than in man.

There is a form of quiet iritis which causes a slow atrophy of the uveal layer unaccompanied by any visible alterations in the anterior layers. By direct illumination the iris appears to be

* 5C seen by reflected light. 5D seen by retro-illumination.

normal. In the senile iris a similar change is very common, and it is especially prone to attack the pupil margin. If we throw the focal beam into the lens and examine the iris in lens-light these changes become obvious, the light shines through the thin pigment layer. In some cases especially where there are tears in the posterior layer we get the appearance of holes in the iris through which we see a red light. Perforations invisible by direct reflected light are plainly seen by retro-illumination. In Fig. 6 we have an iris in which there has been a localized iritis. There is pigment upon the anterior capsule. The light from a point o'light lamp has been focused into the lens, and we see that the iris margin is atrophic and that there are transparent areas in

FIG. 7.

Mr. H., age 45. Blow on eye six weeks ago. Ruptures in peripheral portion of iris. *Same on both sides*. Lighted up by "sclerotic scatter." Illuminates lens vividly by retro-illumination.

the region of the sphincter through which the light shines. The *mamelons* have disappeared from the atrophic region. Fig. 7 is a very interesting case. He had received a severe blow upon the eye. I had examined him some time before I became interested in focal illumination and had entirely missed the fact that the iris was severely injured at the periphery. When a focal beam was thrown into the lens it was obvious that there was a series of radial slits on each side at the periphery. These showed a red reflex when light was thrown upon the limbus, in fact they were more obvious by sclerotic scatter than by lens-light. I am quite unable to explain why this should be the case, and Mr. Graves is unable to help me in this respect. See also Fig. 5D. It is possible that the peripheral slits may account for the oval pupil.

Lens.—In cases of subluxation of the lens, and where there are colobomata, either congenital or from operation, we can see the

suspensory ligament with the loupe and half-watt lamp, and can decide whether it is perfect, imperfect or wanting. This information is of supreme importance because a subluxated lens with a perfect ligament is not likely to alter its position. Fig. 8 shows a subluxated lens with a perfect ligament drawn with an ordinary focus-bulb and a loupe. It will be noted that on most of the filaments there is a nodule of brown pigment. The slit-lamp picture will appear later. Fig. 9 (see coloured plate) portrays another dislocated lens seen by point o'light illumination and the loupe. Here the suspensory ligament is very rudimentary, being represented by a few tags only, and the iris is only partially developed. The vitreous membranes are clearly seen. This case was never examined with the slit-lamp.

To see the lens shagreen with the loupe it is necessary to obtain two conditions of illumination. The patient's gaze must bisect

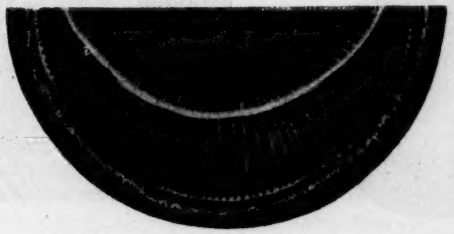

FIG. 8.

the angle between the incident and the reflected ray, and all three lines must lie in the same plane. Beginners fail to see the shagreen because their line of sight is above or below the plane made by the incident ray and the patient's optical axis. Place a half-watt lamp well to the right of the patient, concentrate the light upon his lens with a lens and give him an object to fix straight in front, and observe from the left with the loupe, raising and lowering the head and slightly altering the position of the loupe till it receives the ray reflected from the anterior capsule. In a young subject with a dilated pupil the shagreen looks like the surface of recently cast aluminium, and is a very beautiful subject for study. In older persons the reflex is not so bright, and on occasions it gives diffraction effects, a mother-of-pearl sheen. This iridescence is said to indicate commencing cataract. I have frequently seen iridescence of the lens shagreen in normal young cases examined with loupe and focal light, but this effect is probably not seen with the slit-lamp under normal conditions. Careful focusing of the shagreen will often bring vacuoles into view which lie just under the capsule.

If while viewing the shagreen we advance the lens so as to get a more diffused light we can make out the sutures on the surface of the cortex, those that lie only slightly deeper than the capsule.

Opacities in the lens can be seen and roughly localized by the simple shaft of light, and it is possible to study cataract deep in the lens and posterior capsular cataracts (*cataracta complicata*).

The young lens does not show any lamellation when examined by simple focal methods, but in older subjects a definite nucleus can be distinguished. When the nucleus becomes sclerosed the shaft of light shows very distinct colour bands, which vary from yellow to deep brown in the case of cataracta brunescens and nigra. Under such conditions a distinct mirror can be obtained from the surface of the adult nucleus, and the relief sutures of this nucleus can often be detected here and there. Not infrequently it is

FIG. 10.

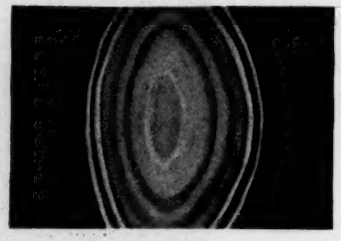

FIG. 11.

L.M., Leamington. Lamellar cataract. (1) View with loupe and 100 watt gas-filled lamp showing "Y." (2) Section of lens.

possible to see the separation or dissociation of the lamellae (*lamelläre zerkluftung*) in an early stage in senile cataract. I have not so far been able to see in the normal lens the embryonic anterior or posterior "Y," but in lamellar cataract both the adult sutures and the "Y" can be seen, generally the anterior, occasionally the posterior. Fig. 10 shows a lamellar cataract observed with a 100 half-watt lamp at ten feet distance and a loupe. The anterior "Y" is plainly visible. The same lens is shown in optical section in Fig. 11.

Vitreous.—The simple focal beam and the loupe allow us to see the vitreous membranes quite clearly and large punctate opacities can be distinguished with certainty (see Fig. 9 coloured plate). Quite recently with the ophthalmoscope I saw some large black punctate bodies floating in the vitreous. With the point o'light beam focused upon them they were beautifully seen as white glistening particles. In some cases the vitreous structure can be made out as well with the loupe as with the slit-lamp because we can approach our visual line closer to the axis of the beam of light than

is possible with the slit-lamp used without Koeppe's mirror. In aphakic eyes and in cases of subluxation the vitreous structure is clearly seen with the loupe. It can occasionally be distinguished in a normal eye with a dilated pupil.

I think that I have said enough to convince you that there is much that can be seen with quite ordinary methods without the use of a slit-lamp or other expensive apparatus, but I may add that I personally had seen few of the appearances that I have mentioned before I used a slit-lamp, and was in fact quite unaware of the real powers of the simple loupe. If I never see a slit-lamp again I shall have gained enormously because the corneal microscope has discovered the dormant capabilities of the loupe, and the slit-lamp has enabled me to utilize the possibilities of a half-watt bulb.

In Gullstrand's slit-lamp the principle of focal illumination reaches its highest development. We are able to project into the eye a powerful, clearly defined, ribbon of light, to modify the width of this beam, and to focus it at will upon any desired spot. By using the pin-hole we obtain a pencil of light which is very useful in the search for cellular elements in the aqueous and for demonstrating relucence of the aqueous. It is also of service for accurate localization in the lens.

I do not intend to describe the construction of the slit-lamp, nor to treat of the methods and technique involved. There are, however, a few practical points which have become obvious from the use of the four slit-lamps that I have at my disposal.

I am quite certain, and here I am in disagreement with Vogt, that the type with the glass top is far better than that with the cross-slides for moving the microscope. With the former one can move the microscope to any desired spot, raise and lower it, and focus it, all with one hand, while the other is occupied with the slit-lamp. The glass top is also cheaper.

Ocular A2 and eye-piece 2 giving a magnification of 23 is almost exclusively used, higher and lower powers are a luxury, but not really necessary for ordinary clinical work.

Finally, the switch supplied with the slit-lamp is quite impossible and must be discarded at once. The best plan is to cut off the cable close to the lamp and introduce a push-through switch which cuts off with a click. Beyond this switch the cable must be cut again and a plug or adapter fitted.

The cable must drop from a hook in the ceiling otherwise it is constantly in the way. The plug is then necessary to enable the cable to be broken for covering the apparatus with a suitable fabric, which must be large enough to include the whole table and prevent dust settling upon the glass top.

The slit-lamp opens up such a wide field that in the time at

my disposal I can mention but a few interesting and typical subjects. I have dealt with the "Normal Anatomy of the Lens" in a paper which I read to the Congress of the Ophthalmological Society at Glasgow, which will be found in the next number of the *Transactions of the Ophthalmological Society*, 1924. Further general information will be found in another paper which I read to the Royal Society of Medicine last January. This appeared in the *British Medical Journal* for May 31, 1924, entitled "The Practical Value of the Slit-lamp." These papers may be considered to be introductory to this lecture.

Inflammation.—The slit-lamp is indispensable in the study of the inflammatory conditions of the eye, but the subject is so far-reaching that it calls for a lecture to itself. Changes take place in the cornea, the aqueous, the iris, and the vitreous all of which are seen with the corneal microscope. The first sign of an inflammation is bedewing of the cornea, but it is such a sensitive sign that it must be used with the greatest caution. The varieties of keratic precipitates can be investigated with the higher powers of the microscope, and probably we may in the future gain valuable help from a classification of these deposits. Koeppe has drawn up a table showing the characteristics of deposits in different diseases, but probably he has gone much farther than present knowledge warrants.

Increased relucence of the aqueous is a valuable sign of an inflamed ciliary body, and when the aqueous contains cellular elements we obtain still more valuable information. Gelatinous masses may appear in the aqueous and are said to favour a gonococcal origin of the inflammation. Cellular elements in the aqueous are seen in Fig. 3.

Contusions of the Eye.—After a severe contusion no blood may be seen in the anterior chamber with the loupe but examination with the small pencil of light will show that the whole aqueous is full of shining particles, blood corpuscles. These stream along in the vortex currents caused by the heat of the beam, and may remain visible for several days. After a perforating wound which has involved the iris the aqueous may be full of iris pigment which after some days begins to settle upon the posterior surface of the cornea and upon the iris. Often after an iridectomy in elderly subjects the whole anterior surface of the iris is peppered with black dots.

After a contusion it is not uncommon to find folding of Descemet's membrane and folds may be found in the anterior capsule of the lens. Fig. 12 shows an appearance that was noted with the ophthalmoscope after a severe blow upon the eye. Seen with plus 20 there were a series of parallel rugae like the sand ridges left by an ebbing tide. It was impossible to localize them,

but the slit-lamp picture (Fig. 13) showed that the rugae were due to folds of the posterior lens capsule. Red particles were seen in the retro-lental space, probably pigment cells.

Often the vitreous becomes quite opaque after a blow which has caused a haemorrhage into the retro-lental space. Seen with the slit-lamp we find a most beautiful picture. The whole field is filled with golden particles which sparkle like the golden-rain firework. Behind we see a dense background like burnished bronze. Here the Czapski microscope may clear up a difficult diagnosis. The vitreous may become opaque from haemorrhage, from dense exudate, or by a new growth. In one case of this kind the slit-lamp at once showed that there was a haemorrhage.

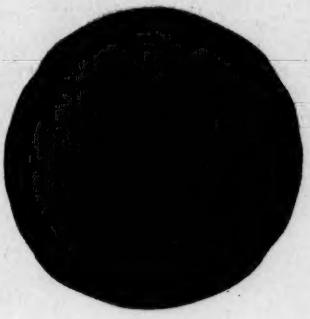

FIG. 12.

FIG. 13.

J.C. Contusion of eye. Folds of posterior capsule. Erythrocytes in vitreous.

We have already seen that a contusion may cause ruptures of the posterior layer of the iris which can be detected only by retro-illumination. Small tears in the pupil margin may be overlooked if the iris be not examined with the corneal microscope.

Wounds.—The slit-lamp will play an important rôle in compensation and medico-legal cases. An examination of the cornea will tell us that a wound has or has not perforated the cornea, and we may be able to prove that a so-called traumatic cataract has no connection with the accident. Fig 14 (see coloured plate) illustrates a very instructive case of this nature. There was a central stellar cataract apparently capsular in position. It had a greenish colour. Centrally in the cornea there was a corneal scar. The man gave a history that some time previously he had been wounded in the eye with a bit of copper wire. The inference was that the cornea had been perforated by the wire and that the anterior capsule had been injured. The copper might, it was suggested, be responsible for the green colour of the cataract. The slit-lamp showed that the

corneal scar extended only half-way through the cornea which had not been perforated. The star-shaped figure was situated not on the anterior capsule but on the surface of the adult nucleus. The drawing shows that the arms of the star just touch and are first lighted up by the posterior edge of the lens prism. Deeper in the lens there were bluish punctate opacities, and a few were found in the other eye. It was at once obvious that we had a cataract which had developed during the first ten years of life, a modification of a cataracta punctata coerulea. Such evidence produced in court would have at once lost the case for the workman and an opposing witness who argued that the cataract was due to

FIG. 15.

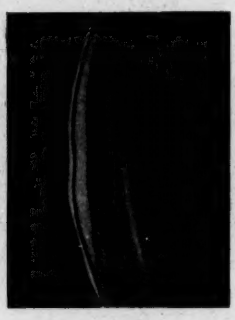

FIG. 16.

Mrs. S.H., Dec. 23. V.L. 6/60. Trivial accident. Nebulae gradually developed during six months. March 24. Has cleared considerably, but still central rounded nebula, vascularization active. ? Keratitis disciformis. Note distortion of corneal surface.

the injury and who had not used the slit-lamp, would have been discredited.

Wounds of the cornea may give rise to a condition not very dissimilar to discoid keratitis. Kraupa has figured cases of the kind, and another has come under my notice. The patient whose cornea is shown in Fig. 15 had six months previously sustained a trivial abrasion of her cornea. There was a central, deeply placed, discoid opacity, with some outlying superficial nebulae. The periphery of the cornea was vascularized and some of the vessels passed nearly to the centre of the cornea. Apparently the vascularization was of a superficial type. The optical section (Fig. 16) made by the narrow ribbon of the slit-lamp showed that the centre of the cornea was umbilicated. Situated in the anterior quarter of the stroma there was a disc-shaped fibrous plate. The whole depth of the cornea was vascularized. I have not yet had the opportunity to examine a case of true keratitis disciformis and to compare it with this traumatic discoid formation.

New Growths and Tuberculosis

Gallimaerts and Kleefeld in the *Annales d'Oculistique*, Vol. CLVII, 1920, page 134 and plate 4, figure a case of sarcoma of limbus which is throwing out a spray of growths into the corneal tissues. Unfortunately, it is not stated in which stratum of the cornea the growths were seen. Fig. 17 illustrates a case which may be of this nature. There was at the corneal margin a vascular, nodular, softish, flat, tumour. Attached to it there was a pedunculated outgrowth. The tumour was regarded as malignant and had been treated with radium at the Radium Institute. Examined with the slit-lamp I found a spray of

FIG. 17.

Mrs. A. C. Dr. Wheeler's case. Growth on limbus with pedunculated outgrowth. Extension of growths of infiltrated areas superficial in cornea. Section of growth said to be innocent.

opacities in the superficial layers of the cornea, probably superficial to Bowman's membrane. These extended about half-way to the pupil margin (the pupil in the drawing is too far to the right). This discovery seemed to me to confirm the theory of malignancy. I advised Dr. Wheeler of Rugby, who sent the case to me, to remove the pedunculated growth and have it examined. Professor Dudgeon of St. Thomas's Hospital reported that the growth was an angioma, a naevus. I have not seen the patient again, but Dr. Wheeler tells me that she has had one more radiation, and that the growth has disappeared. The question arises: was the corneal appearance due to the radium treatment. This must be a subject for future observation.

I have found the slit-lamp of great value in cases of suspected tuberculosis of the iris. I have a case in which a small nodule

appeared at the iris margin in a case of irido-cyclitis of doubtful origin. This nodule was small and had a white gelatinous aspect. The corneal microscope showed that it was not vascularized, and that there were other nodules invisible with the loupe. Careful observation showed that they disappeared and that others took their places. They were exudative and not tubercles.

Glaucoma.—The slit-lamp may render useful services in the diagnosis of glaucoma. Koeppe describes an infiltration of the iris with pigment which he considers to be pathognomonic of glaucoma. I have noted this in all the elderly cases of glaucoma, but not in a younger patient shortly to be described. I found it in the glaucomatous eye of an elderly woman but not in her sound eye. On the other hand Vogt and others have pointed out that an exactly similar condition is present in many aged persons in whom there is no question of glaucoma. I have been able to confirm this view, and we may conclude that this pigment deposit is a sign of iris degeneration and not of glaucoma. It is a well-known fact that degeneration and atrophy of the iris are very common in glaucoma.

In many cases there is great difficulty in deciding whether a case is one of idiopathic or secondary glaucoma. It has been suggested that all glaucomas are due to a cyclitis, but clinically we can and must classify them as primary and secondary, for the treatment of the two classes is diametrically opposite. Examination with the slit-lamp will often show signs of inflammation of the cyclitic type which were difficult to observe with the loupe: we may find fine "K.P." and increased relucence of the aqueous, or cells in the aqueous. The exact interpretation of these signs calls for considerable research. Can they be present in a glaucoma which is not secondary to a cyclitis? Must we be guided by the intensity of these signs, or can we at once say that because we find them, therefore there is a cyclitis causing a secondary glaucoma? I, personally, am not yet in a position to answer these questions. Figs. 18 to 22 illustrate a very interesting and unsual case of glaucoma. The patient was a woman, aged 30 years, who came to the Coventry Hospital for glasses. I was carefully examining her retinal arteries to try to see the circulation of the blood. I have never yet succeeded in this, but my house surgeon at Birmingham, Mr. Hughes, tells me that in a case of partial embolism he has seen the blood streaming along a retinal artery. (Since writing the above we have, at the Birmingham Eye Hospital, been able to see the actual blood stream in the retinal vessels on several occasions.) I noted that there was a faint but distinct arterial pulsation. Examination with the Schiötz Tonometer showed that the tension was raised to 25. I kept the patient under careful observation and eventually the field began to

contract, pain was complained of, and the tension steadily rose in spite of the use of pilocarpin, and I trephined the eye. The conjunctiva was excessively thin and the sclera very soft. I lost the disc in the eye.

On the second day the conjunctiva gave way over the trephine hole leaving a triangular defect (Fig. 22). The slit-lamp showed that the hole was covered with a delicate membrane, but that the

FIG. 18. FIG. 19. FIG. 20.

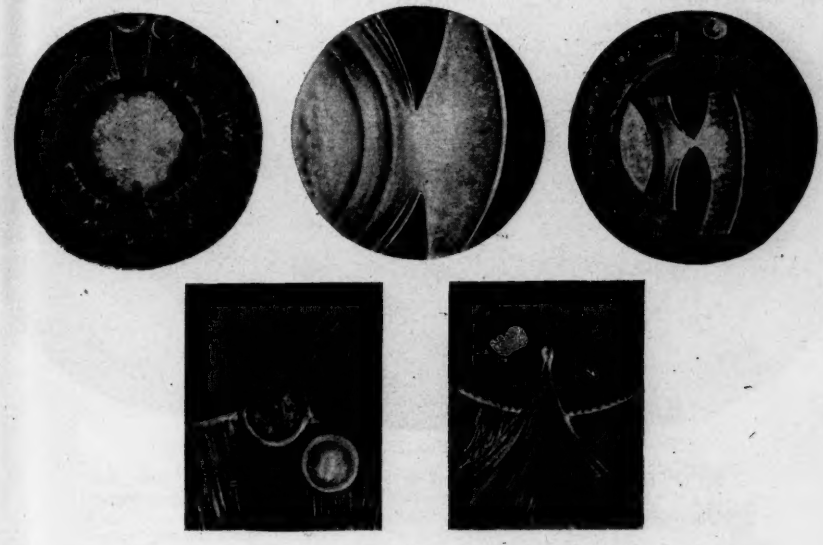

FIG. 22. FIG. 21.

Miss W., age 30. Glaucoma. ***Trephined*** April 9, 1924. Aperture 1/3rd in cornea, very thin conjunctiva. Triangular defect developed over hole covered by thin membrane. This eventually healed up. ***Disc*** lost in a.c. No a.c. re-formed. April 23, 1924, central nebula developed. Due to an adhesion between cornea and lens capsule. ***Apparently a solid adhesion***. April 26, a.c. re-formed. No sign of adhesion, but loss of definition of endothelial cells. A tiny fold of iris adherent to cornea in lower third. This gave way in a week leaving a pigment dot on the cornea.

main thickness of the conjunctiva formed the sides of the triangle. The tension of the eye was very low and the anterior chamber had not re-formed. A fortnight after the operation, during which time the eye had been free from any injection, a dense opacity formed in the centre of the cornea as seen in Fig. 18. At the same time a small fold of iris became attached to the cornea as shown in Fig. 21. Examination with the slit-lamp revealed an apparently desperate condition. The cornea appeared to be greatly thickened and to be compactly fused with the lens. The lens

capsule was drawn up at the sides tent-like to join the cornea. The cornea in this situation was ivory-white and showed no translucency. There was no change in texture between the cornea and the lens at the point of junction. Fig. 19 gives the appearance in the centre of the opacity. Fig. 20 represents the edge of the opacity. Three days later the anterior chamber re-formed and the cornea and lens had resumed their ordinary appearance. A week later the small iris tent broke away from the cornea leaving a spot of pigment. The eye did perfectly well, and now has fair vision and normal tension.

The Pupillary Membrane.—Remnants of the tunica vasculosa lentis anterior are frequently found during examination with the

FIG. 25.

E. G. P., age 18. V. R. and L.c. – 1·25 = 6/3 partly. "Stars" in a.c. Note filaments free in a.c. One reaches right across the chamber. Discovered accidentally in routine slit-lamp examination.

slit-lamp. They may take a great variety of forms. We very frequently see in the centre of the pupil a collection of brown dots. The common appearance is shown in Fig. 23 (see coloured plate). Under a magnification of 35 they are seen to consist of stellate deposits of pigment, generally tripolar (Fig. 24). The points of the brown stars are continued as delicate grey filaments which often anastomose with neighbouring stars to form a fine net-work. The mere fact that the pigment assumes the stellate form does not exclude an inflammatory origin. Vogt emphasizes the fact that all pigment deposits upon the anterior capsule tend in time to take this shape. Quite recently I have seen two cases of old congenital syphilitic iritis in which there were masses of pigment spreading from synechiae on to the capsule. Under high magnification the thin layer on the capsule was entirely composed of stars very similar to the pupillary membrane stars. There were also grey filaments but no network formation. The congenital stars are more regular and not accompanied by any massive deposit. With care and

some experience the two should not be confused, but cases may arise in which it is very difficult to decide with certainty that the stars are not due to old iritis. Fig. 25 shows another not unusual type of persistent pupillary membrane. The boy came to my rooms for refraction and had an acuity of 6/4.5. A branching filament arose from the iris frill and floated free in the anterior chamber. One branch reached right across the chamber. At the

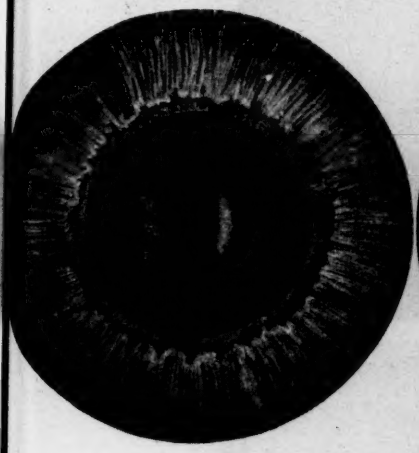

FIG. 26.

FIG. 27.

FIG. 26. J. H., age 13, V. = 6/18. Persistent pupillary membrane. Anterior capsular and posterior capsular cataract.
FIG. 27. A. B. F., age 26. Large fibres obviously originally blood vessels passing from "frill" to anterior capsular cataract "Stars" all over the anterior capsule. Nystagmus. Cornea faintly nebulous.

end of each filament was a knob. There was also a group of stars. Figs. 26 and 27 are examples of similar conditions.

The anomaly in Fig. 27 was probably due to intra-uterine gonococcal infection which gave rise to an anterior polar cataract and retarded the absorption of the pupillary membrane.

The condition shown in Fig. 28 has been considered as a pupillary remnant, but Vogt insists that it is not of this nature but is due to intra-uterine iritis. The thick filaments at the iris periphery do not arise from the frill but from the pupil ruff. In addition there was a group of stars and part of the capsule was covered with a gossamer-like film, like the substance in a coccoon. The fact that the filaments do not arise from the frill appears to be almost conclusive evidence that they are of inflammatory origin. When I saw the case and drew it I was under the impression that I had before me an atypical example of persistent tunica vasculosa, but after reading Vogt's remarks I am convinced of their validity.

The Suspensory Ligament forms an interesting study for the slit-lamp. It can be seen only when there is a natural coloboma or when the lens is dislocated. Generally speaking, the coloboma

FIG. 28.

FIG. 29.

formed by an iridectomy is not sufficiently peripheral to show the ligament. We have already seen a perfect suspensory ligament drawn from an examination with the loupe (Fig. 8). The slit-lamp picture of the same lens is shown in Fig. 29. The corneal prism

is seen on the right followed by the illuminated part of the lens which in the microscope gives the impression of a large grindstone. The edge of the lens is brightly lighted up because here the rays of light strike the back of the lens at an angle greater than the critical angle and are in consequence totally reflected up the back of the lens giving rise to the caustic-like curve seen between the posterior capsule and the lens edge.

Below we see the fibres of the suspensory ligament which appear like trees in a forest, row upon row. Behind the filaments

FIG. 31.

FIG. 30.

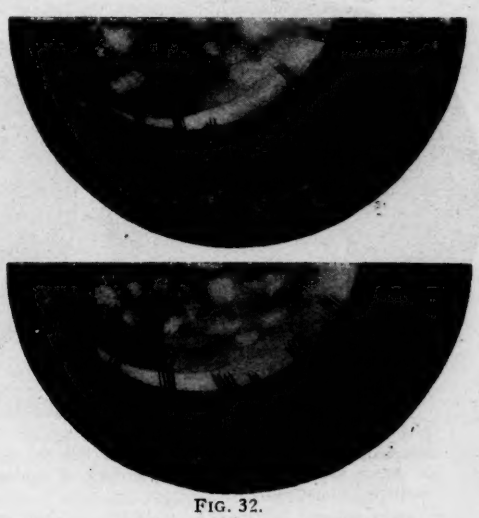

FIG. 32.

J. B. Subluxatio lentis. Right has been needled. Shows suspensory ligament, incomplete in right eye. Small figure; view with ophthalmoscope with +20 lens shows faint striation. Large figures R. and L. slit lamp × 24.

we note the vitreous framework and to the extreme left some red reflex from the retina. In this case many of the filaments of the ligament were branched at the lens end, and most of them had a shining nodule of brown pigment attached to some part of their length. These nodules were detected with the loupe and simple focal illumination. The edge of the lens in this and the succeeding pictures is too circular. The actual lens edge consists of a series of irregular almost flat surfaces, in fact the lens is a rough polygon. A study of the suspensory ligament enables us to classify dislocated lenses in respect of the degree of development of the fibres. The ligament may be perfect, rudimentary or absent. I suggest that those cases with a perfect ligament be

called "*decentred lenses*"; those with a rudimentary ligament "*ectopia lentis*"; and those with none "*subluxated lenses.*"

Fig. 30 shows a familial case of ectopia lentis as seen with the ophthalmoscope and a plus 20 lens. A faint striation can be made out in the region of the ligament by very careful focusing. The slit-lamp picture of the right and left lens is found under Figs. 31 and 32. It will be noted that the ligament is badly developed and in one place torn away. This rupture was probably caused by a needling operation. The marks of the capsule rupture are seen

FIG. 33.

FIG. 34.

J. A. Age 5. Congenital subluxation of lenses. Father had "bad eyes." Left discission twice. Lens became opaque but did not absorb. Shows right, fibres of tunica vasculosa; left, fibre network of tunica vasculosa. No trace of any suspensory ligament.

in Fig. 31, and it will be observed that the lens has become opaque but unfortunately not absorbed.

Another familial case showing no trace of a ligament is figured in Figs. 33 and 34. The left lens has been needled three times and is opaque. This case shows remnants of a pupillary membrane. We can find traces of the pupillary membrane in about 20 per cent. of all cases of congenital dislocation of the lens. Whether they are more frequent when the suspensory ligament is wanting I cannot say, but we have here a field for research. I have already shown in Fig. 9 an example of subluxatio lentis with a functionless and rudimentary ligament, and in this case the anterior layers of the iris were only partially developed.

An examination of the ligament and a classification founded upon its degree of development is of great clinical value. It is quite unlikely that cases of decentration will pass into complete dislocation, whereas a lens with no suspensory ligament may be

expected to alter its position in the eye, to enter the anterior chamber or to fall into the vitreous. Those with a badly developed ligament will occupy a middle position in this respect. The liability to dislocation will vary according to the development of the ligament. Again had I known the condition of the ligament in cases 33 and 34 I should have hesitated to carry out the operations that I performed. No case of congenital lens dislocation

FIG. 35.

L. V. B. J., age 21. V = 6/5 6/5 c - 2.5, - 2.5. Each lens shows a minute scintillating opacity at centre of infantile nucleus. *Bogenlinie* clearly seen. Note yellow cortex and blue nucleus. A second opacity in posterior cortex.

should be submitted to operation until the eye has been carefully examined with the slit-lamp.

Cataract.—The subject of cataract from the standpoint of the appearances seen with the slit-lamp is so vast that a whole lecture might well be devoted to it, and then it would but touch the fringe of the whole garment. All that I can do in the time at my disposal is to show you some drawings of typical cases.

Fig. 35 illustrates the lens of a boy, aged 21 years, who came to my rooms for refraction. With a low minus glass he had normal acuity. I examined him with the slit-lamp as a routine practice and found certain abnormalities. The cortex was of a yellowish hue whereas the rest of the lens was unusually blue. The infantile nucleus was sharply differentiated by a yellowish condensation line. In the centre of the anterior limit of this

nucleus there was a scintillating opacity of the type found in lamellar cataract. This threw a dense shadow back into the lens as every opacity must do. There was a similar opacity placed eccentrically in the posterior surface of the adult nucleus. On

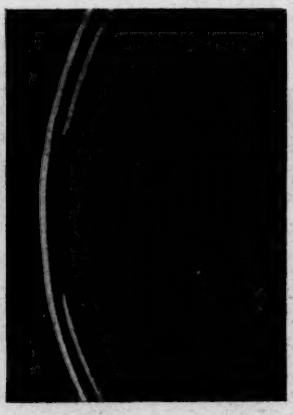

FIG. 36.

L. B., age 44. Opacification of right lens. Showing large "fluid-clefts" in cortex. One invades the adult nucleus and the reduplication line.

FIG. 37.

H. T., age 21. Close to a flash of lightning. Capsular opacity: V = 6/6 partly.

the posterior capsule there was a well-marked semicircular arc-line (*Bogenlinie*). This I have merely indicated by the white semicircle behind the lens. In Fig. 36 we see a fluid-cleft (*Wasserspalt*) in a case of rapidly developing cortical cataract. It will be observed that the reduplication line is becoming absorbed

and that the adult nucleus is penetrated. This shows that the reduplication line is in no sense a kind of internal capsule, but is composed of ordinary lens material.

Fig. 37 exhibits a case of *cataracta electrica*. The patient was quite close to a flash of lightning. The cataract is, as is usual in these cases, capsular. The ray-like out-growths may be due to the path taken by the current along the anterior capsule. The vision was normal and the patient came for refraction.

A case of *cataracta punctata coerulea* is shown in Figs. 38 and 39 (see coloured plate). This type of cataract has generally been regarded as congenital and non-progressive. The section shows that the opacity is entirely outside the infantile nucleus and

FIG. 40.

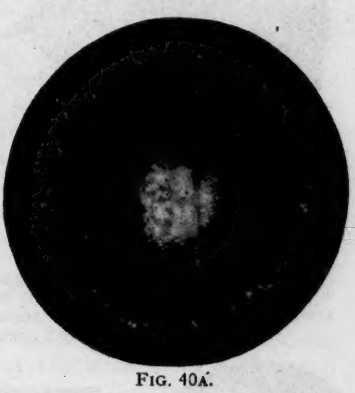

FIG. 40A.

Mrs. M., age 43. R.V. = 6/9. L.V. = 6/18. Both similar pictures. Snow white lace-work just in front of posterior capsule. Fig. 40. View with + 20. Fig. 40A Slit-lamp picture.

cannot therefore be congenital. I have seen this type of cataract develop in a patient whom I had examined some years before and had noted that his media were clear. In another case I have seen a decided increase of the cataract with marked deterioration in acuity.

A *posterior capsular cataract* is portrayed in Figs. 40 and 40A. The ophthalmoscope with plus 20 showed a lace-like dark opacity deep in the lens. The slit-lamp localized it in the posterior cortex and the posterior capsule. The figure shows the white opacity as seen with the broad ribbon somewhat out of focus which gives a more diffuse illumination and allows a larger area to be lighted up.

Figs. 41 and 42 illustrate a very unusual type of cataract. It is chiefly located in the posterior cortex, but it is continued round the equator and appears in the anterior cortex as a lace-like opacity.

In Fig. 42 it will be noted that the edge of the adult nucleus is strongly differentiated from the rest of the lens, so much so that we get total internal reflection at its edge. This shows that even in a boy aged 21 years there may be a great increase of the index

FIG. 42.

FIG. 41.

Boy, age 21. Lamellar cataract of cortex. The posterior cortex is affected and the lace-like opacity curls forward to form the iris-like appearance. Note in the × 35 picture the appearance of a lens edge with bright border. This is the edge of the adult nucleus. The iris is not shown in the figure.

FIG. 43.

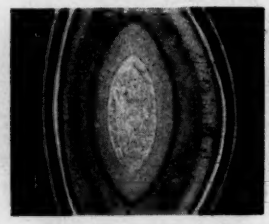

FIG. 44.

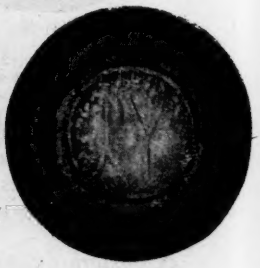

FIG. 45.

Familial cataract. G. A., age 12. V.R. = 6/36. V.L. = 6/60 Aunt and great aunt similar cataract. (43) Ophthalmoscope + 20. (44) Slit-lamp section. (45) The slit-lamp view with broad ribbon.

of refraction between the adult nucleus and the cortex. Freitag has shown that this difference is often greater in the young than in the old lens. The same phenomenon can be seen in lamellar cataract.

A case of *familial cataract* is presented in Figs. 43, 44 and 45. The ophthalmoscope picture shows the usual marble-like central

opacity. The slit-lamp shows that the central opacity is surrounded by a halo and that both the anterior and posterior "Y's" are unusually prominent. This is the rule in lamellar and familial cataracts. The section shows a central scintillating almost stone-like opacity surrounded by an area of condensation which corresponds to the infantile nucleus. The central opacity comprises the whole of the embryonic nucleus.

A study of *lamellar cataract* with the slit-lamp brings out the fact that generally in addition to the wreath of opacity in the infantile nucleus, an area that suggests a mass of machine-made ice, there are other concentric layers of condensation which account for the halos that so frequently surround the main opacity.

The Vitreous. The anterior part of the vitreous can be examined with the slit-lamp and the ordinary microscope. The deeper portions cannot be seen without considerable modification of the apparatus. If the pupil is undilated the narrow beam must be used. Considerable experience is needed rightly to interpret the picture and to separate normal from pathological states. The strand-like figures are in general not fibrils but the edges of the folds in the membranes which make up the architecture of the vitreous. These wave about with the movements of the eye.

If they return to the same place the vitreous is in this respect normal, but if they change their position it is pathological. The presence of detached fibrils and of small particles is evidence of a degenerated vitreous. Generally the strands do not appear to reach the back of the lens. There is a definite clear space, the retro-lental space. The actual existence of this space is proved by the fact that blood sinks to the bottom as in a hyphaema and moves its position if the patient lie on his side for a time. Red dots in the vitreous are not blood corpuscles but pigment masses. Blood cells have a golden yellow colour.

The Retina. The retina can be examined with the slit-lamp and microscope under a high magnification. A contact glass must be placed upon the cornea to abolish its curvature. This can be done without the use of cocain and appears to cause no discomfort. If the ordinary microscope be used it must be hung vertically upon a gallows (Gallimaerts and Kleefeld, *Annales d'Oculistique*, 1922, page 264), and the light reflected into the eye with a horizontal mirror, or a microscope with a single ocular must be used. This instrument called the "*bitumi*" was invented by Siedentopf. It gives an inverted image and is difficult to use. It is better to employ an arc-lamp instead of the nitra lamp. A full account of the examination of the vitreous and the retina will be found in Koeppe's book.

Vogt points out that it is by no means clear that the arc-lamp is free from risk. It is possible that it may injure the lens. In all cases the narrow beam must be used.

Rabbits' eyes have been exposed without injury for several hours to the full beam of a slit-lamp furnished with an arc-lamp, but it is not certain that the human lens would be equally tolerant. The examination of the retina with the slit-lamp is useful for research, but is almost outside the scope of clinical work. In certain cases of doubtful tumour of the choroid it has proved useful.

The drawings illustrating this lecture have in the main been made at home in the evening from rough sketches, and in consequence cannot be regarded as absolutely accurate. In some cases they have been corrected by subsequent examination of the patient, but lack of time has not permitted this to be done in all cases.

COUNCIL OF BRITISH OPHTHALMOLOGISTS

Administration of Optical Benefits under the National Insurance Act

A brief account of the steps taken by the Council with regard to the above appeared in the February number of the journal.

On May 15 last a conference was held at the house of the Royal Society of Medicine with representatives of the British Medical Association. It was agreed to appoint a joint committee to consider the question.

This joint committee made the following recommendations:

(*a*) That the so-called "Optical Benefit" shall be designated "Ophthalmic Benefit."

Ophthalmic benefit would include examination and prescription for spectacles, if required, and such operative treatment and advice as can be given at a single consultation at the consulting room. A report, when necessary, shall be given for the guidance of the private practitioner.

(*b*) That in order to ensure the satisfactory working of the proposed scheme, it is essential that the insured members of every approved society, should in any case of ocular disorder or visual defect, apply to their insurance practitioner.

(*c*) If the insurance practitioner considers the case one requiring special advice or treatment, he should give the applicant a certificate which would enable him to consult a specialist at a reduced fee, and, at the same time, a list of the ophthalmic medical

practitioners in the district in which he resides who are willing to see him for such a fee.

(*d*) A list of ophthalmic medical practitioners qualified and willing to see insured members of approved societies at a consultation fee of £1 1s. should be prepared in accordance with the following principles:

(i) That he has held hospital or other appointments affording special opportunities for acquiring special skill and experience of the kind required for the performance of the service rendered, and has had actual recent practice in performing the service rendered or services of a similar character, or

(ii) That he has had special academic or post-graduate study of a subject which comprises the service rendered, and has had actual practice as aforesaid, or

(iii) That he is generally recognized by other practitioners in the area as having special proficiency and experience in a subject which comprises the service rendered.

(*e*) That a list be prepared of opticians who are willing to supply optical appliances prescribed by medical practitioners for insured members of approved societies in accordance with an agreed schedule of charges.

(*f*) In the event of the surplus funds of an approved society being insufficient to allow of its paying the specialist's reduced fee of £1 1s. for consultation, the patient himself will be required to furnish any amount additional to that which the approved society is able to grant for this purpose.

These recommendations were approved by the Council and forwarded to the Ministry of Health, and a reply has been received from the Ministry stating that a small office committee has been appointed to consider the question.

ANNOTATION

Undergraduate and Graduate Teaching in Ophthalmology

IT is interesting to find from the appendix of the 1923 volume of the *Transactions of the American Ophthalmological Society*, that in the United States of America, as in this country, the subject of teaching ophthalmology to undergraduates and graduates has been receiving considerable attention. Readers of this journal will recollect that these matters formed the subject of two reports by the Council of British Ophthalmologists in 1919 (*Brit. Jl. of Ophthal.*, Vol. III, pp. 165, and 558).

Undergraduate Teaching

With regard to undergraduate teaching the British Council's recommendations were:

(1) No student shall be admitted to the final examination, qualifying to practise medicine unless he has attended an ophthalmic clinic for not less than six hours a week during a period of three months, and has attended a course of systematic instruction in ophthalmology.

(2) No student shall be considered to have passed the qualifying examination unless he has shown a sound knowledge of practical ophthalmology in an examination conducted by ophthalmic surgeons.

The Committee appointed by the American Ophthalmological Society to investigate this subject suggest: That for the present 60 hours may be taken as the proper allotment for the teaching of ophthalmology in the undergraduate course; of which four to eight hours might be devoted to didactic and 52 to 56 to clinical instruction.

Three supplementary reports by Drs. G. Derby, Arnold Knapp, and G. M. Byers give the summing up of answers received from a number of graduates, who had been in practice for several years, as to the value they attached to the instruction they received in ophthalmology in their undergraduate days.

The questions sent out were as follow:

(1) Of what value has the undergraduate instruction in ophthalmology been to you in your line of work?

(2) If it has been of value, which part of the instruction could with benefit be enlarged upon?

(3) If it has not been of value, do you feel that it should be omitted from the undergraduate studies?

The conclusions drawn from the answers received by Dr. Derby, which were substantially the same as those arrived at by Drs. Knapp and Byers, are as follow:

"That the course in ophthalmology is of real use to the student and should not be omitted.

"That the great part of the time should be devoted to practical work in ophthalmoscopy and in studying the commoner diseases and injuries of the eye.

"Sections should not exceed six men. We have had experience with sections of six and twelve and believe that the smaller number is far superior."

Unfortunately, the General Medical Council in this country, to whom the Council of British Ophthalmologists sent their report, did not see their way to adopt it in its entirety, but recommended:

"That every student should be required to attend a course of

practical instruction in ophthalmology of not less than ten weeks' duration, and that no student should be admitted to the final examination unless he presents a certificate to the effect that he has attended such a course regularly, and that his work in connection therewith has reached a satisfactory standard."

Great Britain, therefore, still lags behind the Irish and large majority of American and other foreign universities in the teaching of ophthalmology to undergraduates, for at them it forms one of the subjects of the qualifying examinations and the examiners are invariably ophthalmic surgeons. Experience has shown that without such regularly applied tests by licensing bodies there can be no guarantee that a uniform standard of knowledge of ophthalmology has been acquired by students coming from different schools. The General Medical Council would not dream of accepting a certificate from a student's teacher that he had attended instruction regularly, and that his work had reached a satisfactory standard, as evidence that he had sufficient knowledge of medicine, surgery or midwifery to entitle him to a diploma to practise. Why then, if a knowledge of ophthalmology is admitted to be essential, should a different method be adopted for testing it to that which is employed in other subjects?

Graduate Teaching

The report on the graduate teaching of ophthalmology in the *Transactions of the American Ophthalmological Society* is signed by Drs. E. Jackson, F. H. Verhoeff and T. B. Holloway. Some of the passages in it are so much in accordance with the experience of those who have devoted special attention to the subject in this country that it is well to quote them at length.

Thus dealing with the lack of adequate preparation of many of those who take up ophthalmology as a special branch of practice the report says:

"The average undergraduate student has been expected to learn a great deal about the fundamental branches, anatomy, physiology, and pathology, that did not seem to have any practical connection with his subsequent studies in practice. And, having spent his time acquiring so much that seemed useless, he has assumed that he has been taught all that could be useful. The young doctor of medicine, advised not to think of a speciality until long after he has put the study of anatomy behind him—he hopes for ever—assumes that he was taught, along with the relations of the structures in Scarpa's triangle, all the anatomy of the eye that he will ever need to know.

"He believes that, having been puzzled by the layers of the retina, when he had no interest in the purposes they serve, he learned as much of the histology as he can ever find useful. He was not conscious of any significance that might attach to the behaviour of visual purple, and the suggestions that might come from it as to the influence of

exhaustion or after-images on visual acuity. The facts of pathology were presented in relation to the appendix, the spinal column, the liver, or the kidney; but were not understood or appreciated with regard to intraocular pressure, transparency of the media, or sclerosis of the retinal vessels. In a word, the man or woman who has been dubbed a doctor in medicine, turns to ophthalmic practice as a special field of work with the impression that he has all the training he needs as to the fundamentals of medicine, and only lacks an acquaintance with clinical methods and appearances and a perfected operative technic to fit him for the duties of a practising ophthalmologist.

"The first thing an aspirant must be taught is that there is a good deal of the anatomy, histology, and embryology of the eye that he has never learned in the medical college and must know before he can make a good clinical examination of an eye; that physiologic optics is a large subject, fundamental to ophthalmic practice, and directly entering into the most extensive branch of the work of the oculist; and that pathology appears in a new aspect in relation to the eye, and gives significance to what is seen with the ophthalmoscope or ocular microscope.

"It should be made clear to everyone interested that the first step in preparation for special practice is to study the special anatomy, histology, embryology, and physiology of the eye; elementary optics with so much trigonometry as is needed for its understanding; pathology as manifested in the ocular tissues; and bacteriology of the ocular infections, both superficial and deep."

The oldest school of ophthalmology in the English-speaking world is that connected with the Moorfields Eye Hospital; it was established in 1810 by Dr. R. J. Farre and Benjamin Travers, when the institution was known as the London Ophthalmic Infirmary. The aims of the school in its early days were well set out by William Lawrence (afterwards Sir William), who joined it in 1814, and it is interesting to compare them with those above quoted as the requirements of to-day. In the introduction to his "Treatise on Diseases of the Eye," published in 1833, he says: "The course of proceeding in learning the diseases of the eye must be the same as that for diseases in general. The art of treating diseases, or medicine, taken in its most extensive sense, is founded on the sciences of anatomy, physiology, pathology, and therapeutics; in other words, a knowledge of the healthy structure and function must be first obtained; and, lastly, the external agencies capable of influencing the body, so as to remove disease or restore health, must be studied."

How well he put into practice the above views may be gathered from perusal of his treatise, which was based on the lectures which he delivered at the London Ophthalmic Infirmary on anatomy, physiology, and diseases of the eye.

As the staff of the hospital increased in numbers, and the knowledge of ophthalmology and its ancillary subjects enlarged in amount, so we find the teaching of its different branches became

divided up into separate courses. Dalrymple, who was appointed on the staff in 1832, delivered soon after a course of lectures upon the anatomy of the human eye, accompanied, as he says "by a series of dissections laboriously and minutely followed out"; these were published in book form in 1834.

The classical lectures of Sir William Bowman "on the anatomy of parts concerned in the operations on the eye," were first delivered at the Moorfields Hospital in 1847.

Regular systematic courses of instruction in the use of the ophthalmoscope were established by Marcus Gunn in 1883, and ever since have formed a most attractive feature of the post-graduate teaching at Moorfields.

*Hulke has described how in his early days errors of refraction were so little understood that a small tortoise-shell case, containing half a dozen convex and concave spherical lenses, which could be easily carried in the trousers pocket, was held to comprise a sufficient stock for every trial, and that it was not until the publication of Donders' classical work on disorders of refraction and accommodation that much progress was made in their scientific diagnosis and treatment.

Soelberg Wells and then John Couper were the first chief exponents of the correction of refractive errors at Moorfields, but it was not until William Lang was appointed on the staff in 1884 that systematic courses of instruction in elementary optics and the refraction of the eye were established.

The teaching of pathology, which as already stated was started by Lawrence, was greatly aided by the establishment of a pathological laboratory and museum about 1855. Here the curators have, in succession, ever since conducted practical courses of instruction.

In 1907 a bacteriological laboratory was instituted with a separate presiding officer, and practical instruction in this branch of ophthalmology became added to the curriculum.

Though operative dexterity is usually an innate gift much can be acquired. The methods of procedure and the art of handling instruments can be taught on animals' eyes fixed in a suitable frame. For several years, during the latter part of last century and the beginning of this, Stanford Morton conducted private courses of instruction of this sort which were most deservedly popular, and which later became incorporated with the regular teaching conducted at Moorfields.

A considerable stimulus to the study of the preliminary essentials of a sound ophthalmic training has been given of late years by the conferring of diplomas in ophthalmology, in the first instance by the University of Oxford, and more recently by the

* *Trans. Ophthal. Soc.*, Vol. VII, p. 20, 1887.

Royal Colleges of Surgeons and Physicians in London. To obtain these diplomas, candidates before presenting themselves for examination, have to attend certain prescribed courses of instruction on anatomy and physiology of the eye, physiological optics and pathology. The result has been the establishment at the University of Oxford, and at the different Ophthalmic Hospitals in London of special courses to meet these requirements.

This brief outline of the growth of ophthalmic teaching in this country will serve to show that it has developed, not as the result of any set plan, but by gradual accretions to meet the requirements of students and the advances of knowledge.

The committee of the American Ophthalmological Society in the concluding passages in its report states:

"It is certainly surprising that no one has ever offered to donate a large sum for the advancement of ophthalmology. This must be due to the fact that our needs have not been sufficiently advertised."

It is probably still more surprising that the teaching at Moorfields has been so successfully carried on for over one hundred years without any endowment, the only funds available being those derived from the students' fees. How much this redounds to the self-sacrificing services of the members of the surgical staff, past and present, may be gathered from the next paragraph of the report which runs as follows:

"The chief difficulty in organizing a graduate school of ophthalmology is in obtaining properly qualified teachers who are willing to devote sufficient time to the school. Most ophthalmologists feel that after they have given a large part of their time to clinical work in the hospital they must devote the rest of their time to making a living in private practice. The only way this difficulty can be overcome is to provide adequate salaries for the teachers."

ABSTRACTS

I.—DISEASES OF RETINA

(1) **Sourdille, G. (Nantes).—A method of treating detachment of the retina. (Une méthode de traitement de décollement de la rétine.)** *Arch. d'Ophtal.*, July, 1923.

(1) In this paper, presented to l'Académie de Médecine, **Prof. Sourdille** recounts his experiences, and describes the technique he employs in the treatment of detachment of the retina by operative measures. He is much more sanguine than most writers on this subject and certainly his published results seem to justify his optimism. He deplores the fact that repeated failures have so

discouraged many surgeons that they have desisted from further attempts; "at the present time scepticism is almost universal, and more than ever before detachment of the retina, both to the laity and the medical profession, maintains its unenviable reputation of incurability."

Before describing his views and methods, the author refers briefly to the work of numerous observers, such as H. Müller, de Wecker, Leber, Nordenson and others, and their opinions on the pathogenesis of detachment. His own anatomical and clinical researches have led him to opinions which he thinks agree better than earlier hypotheses with observed facts, but these he reserves for a later communication.

Any form of treatment should be guided by two principles: (1) to favour the re-adaptation of the retina to its pigment epithelium; (2) to induce in the choroid and the epithelium an inflammatory reaction sufficient to bring about adhesion of these two structures without exciting anatomical changes which might impair vision.

The obstacles to the replacement of the retina in contact with the pigment epithelium are, in recent cases, (*a*) the presence of subretinal fluid, (*b*) retraction of the detached retina. Although the retina itself contains no elastic or contractile elements the author believes that the blood-vessels of the detached retina exert a contractile influence, and tend to assume and to cause the retina to assume, the direction of the chord of the arc which they followed when the retina was *in situ*. In detachment of long standing there are also other obstacles due to degenerative changes in the vitreous and the retina. If these are in an advanced stage the detachment has become incurable. To ensure the replacement of the retina the two obstacles (*a*) and (*b*) must be overcome; to attain this result two procedures are essential and are sometimes sufficient; they are evacuation of the subretinal fluid by multiple punctures of the sclera and choroid and perforation of the retina.

Sourdille has two methods of operating which he describes in detail and illustrates by diagrams. A very condensed report of these must suffice; those who are interested will do well to read his description. In the first method, which he employs in nearly all cases, he uses a narrow, sharp-pointed thin Graefe knife. With this he makes three or four punctures, entering the knife at least 10 or 12 mm. towards the centre of the eyeball, traversing the subretinal space and perforating the detached retina. By slight rotation of the blade vitreous is allowed to escape beneath the conjunctiva, and the knife is then withdrawn. Into the oedematous subconjunctival area which results, 1 to 2 c.cm. of aqueous solution of cyanide of mercury, 1-1,000, to which a few drops of 5 per cent. solution of cocain or novocain have been added, are injected. This fluid, the author thinks, finds its way through the scleral punctures. The eye is then bandaged and the patient kept at rest on his back.

In three instances a fine galvano-cautery point was used instead of the knife. This method the author reserves for shallow detachments.

As soon as the chemosis and injection following the operation have subsided, subconjunctival injections of 6 per cent. solution of Na Cl are given once a week. Complete rest is enforced for about three weeks.

In a period of 2½ years, Sourdille has operated upon 35 eyes in 30 patients; one case being still under treatment is not included in his results. In 16 cases of recent detachment he claims nine permanent cures and one lasting improvement. In 18 cases of detachment of long standing he had nine with permanent improvement.

Clinical notes of 12 cases are appended. Sourdille's results in the treatment of one of the most intractable of ocular diseases are so striking that the methods he advocates deserve attention. The principle of tapping the subretinal space through the sclera and choroid, and the vitreous chamber through the detached retina can scarcely be considered novel and the method in which the galvano-cautery is employed, is already familiar, at least to surgeons in this country. In several respects, however, the author has departed from former practice and the results obtained by him should encourage further attempts on somewhat similar lines.

J. B. LAWFORD.

(2) **Greenwood, Allen (Boston). — Thrombosis of the central retinal vein and its branches.** *Jl. of the Amer. Med. Assoc.*, January, 1924.

(2) **Greenwood,** in discussing this subject and reviewing the literature, believes that the venous obstruction is always slow in developing and that when one of the retinal branches is involved the first compression of the vein has been due to an overlying, thickened artery or a thickened artery which winds round the vein. When the central artery is involved the obstruction occurs at the lamina cribrosa and here the central vein is compressed by a thickened artery; probably an endophlebitis is present at the point where the vein is pressed upon, with the final formation of a thrombus.

He points out that the treatment must be directed to the restoration of vision as far as possible and the prevention of glaucoma. He uses amyl nitrite inhalations and some form of nitrite internally, pilocarpin and purges. Iodine preparations internally are useful for prolonged treatment, small doses of syrup of hydriodic acid can be similarly used. It is important to take the tension frequently, and miotics should be prescribed even when there is no increased tension. It is important to have the patient generally overhauled.

E. R. CHAMBERS.

II.—OPTIC NERVE

(1) **Archer-Hall, H. W. (Birmingham).—A case of bilateral retro-ocular neuritis.** *Lancet*, April 1, 1922.

(1) **Archer-Hall's** case is an interesting one from the aetiological standpoint. A married woman aged 22, suffered from double retro-ocular neuritis. A dental septic focus was suspected and the teeth were radiographed by Dr. Harold Black. The patient and the radiograms were taken to Mr. Harold Round, who, on casual examination, did not think there was much chance of finding anything orally to account for the condition. Yet, on more careful examination, along with the radiograms, three teeth were suspected and removed. Two out of three showed apical absorption. The patient recovered full vision and fields at the end of five or six weeks, although originally she had been so blind that she had had to be led. Assuming the correctness of the relation between cause and effect in this case, what strikes one is the difficulty of diagnosis of a septic dental focus giving very slight symptoms or signs and yet sufficient to cause severe retro-ocular neuritis. Prints of ten radiograms accompany the article.

ERNEST THOMSON.

(2) **Martin, Paul, and Cushing, Harvey.—Primary gliomas of the chiasm and optic nerves in their intracranial portion.** *Arch. of Ophthal.*, Vol. LII, No. 3, p. 209, May, 1923.

(2) This valuable and suggestive paper by **Martin** and **Cushing** deals with the records of seven tumours (gliomatous) originating either in the chiasm or in the optic nerves adjacent to it. It is profusely and beautifully illustrated. One of its main objects is to suggest to ophthalmologists an explanation of some of those obscure cases of primary optic atrophy which they so often vaguely attribute to retro-bulbar neuritis. The association of a primary atrophy of the optic nerves in young people with the peculiar sellar deformation which is described in this paper, in the absence of the shadows usually cast by the more common tumours of this region in childhood, will suggest the possibility that the symptoms are due to a primary glioma of the chiasm, and will prevent the undertaking of useless operative procedures in this hopeless class of cases.

R. H. ELLIOT.

(3) **Brazeau, G. N. (Milwaukee, Wis.).—Serous tenonitis complicated by bilateral papilloedema.** *Arch. of Ophthal.*, July, 1923.

(3) **Brazeau's** case occurred in a healthy man aged 30. There was bilateral proptosis, complete external ophthalmoplegia, marked

chemosis in the left eye, and bilateral papilloedema, the swelling in the right eye being 1D, and in the left 4D. Visual acuity was normal. There was nothing to indicate cerebral tumour; orbital cellulitis was ruled out by the absence of pain and tenderness on pressure and by negative X-ray findings.

The case was regarded as one of tenonitis of rheumatic origin. Treatment consisted of sodii sal. grs. 10, aspirin grs. 5, thrice daily. This was successful within six weeks, when all manifestations disappeared except a paralysis of the left inferior oblique muscle.

F. A. WILLIAMSON-NOBLE.

(4) **Woods, Alan C., and Dunn, J. R.—Etiologic study of a series of optic neuropathies.** *Jl. Amer. Med. Assoc.*, April 21, 1923.

(4) **Woods and Dunn** in this paper give their experience in a series of eighty-six patients who presented various optic nerve changes, and try to determine the possible relationship of any of these changes to nasal sinus disease.

Cases of trauma, glaucoma, retinitis pigmentosa, and cases referred from other departments for consultation are excluded from the series, which includes only those cases which presented themselves at the clinic on account of visual disturbances. The examination was undertaken in the following order: a complete ophthalmological examination, medical, neurological, laryngological, and serological examinations.

Thirty-five optic neuropathies, or 40 per cent. of the total cases studied were due to syphilis; 11, or 12·7 per cent. were caused by sinus disease; 10, or 11·6 per cent. were due to tumours of the cerebrum or optic nerve; five, or 5·8 per cent were due to multiple sclerosis; ten, or 11·6 per cent. belonged to the toxic amblyopia group; three, or 3·5 per cent. occurred in widely separated conditions, Friedreich's disease group, Mongolian idiocy, and epidemic encephalitis lethargica. In 12 cases, or 14 per cent., no definite diagnosis was justifiable.

From the ophthalmological point of view, there were 35 cases of primary atrophy; of these, 25 were due to syphilis, one to multiple sclerosis, four to the toxic amblyopia group, and five were undetermined. There were 13 cases of secondary atrophy, of which two were due to syphilis, four to brain tumour, one occurred in Mongolian idiocy, and four were undetermined. There were 24 cases of atrophy of the papillo-macular bundle; of these, four apparently due to syphilis, six to sinus disease, one to brain tumour, four to multiple sclerosis, five to toxic amblyopia, one to the Friedreich's disease group, and three were undetermined. There were five cases of optic neuritis; three of these occurred in syphilis, one in the toxic amblyopia group, and one in epidemic

encephalitis. Four cases of choked disc were seen, and in all a tumour of the brain was located; five cases of retro-bulbar neuritis complete the series; one of these was due to syphilis, four to sinus disease, and in one case there was a pre-chiasmal tumour of the optic nerve.

As regards the sinus disease cases, four were in the acute stage and seven in the atrophic stage. The acute cases all presented the same clinical picture, that of a retro-bulbar neuritis, with clear media, diminished vision, normal fundi and a central scotoma; three of these patients had a pyogenic infection of the ethmoidal sinuses, and two of them showed a complicating infection of the sphenoidal sinus; the fourth case had nothing but polypi in the posterior ethmoidal cells. All four cases were operated on and made a complete recovery.

Five of the patients in the atrophic stage gave the picture of a primary atrophy of the papillo-macular bundle, without any signs of previous inflammation round the nerve head; one case showed a general atrophy especially marked in the outer half of the disc, with blurring of the margins and a deposit of new connective tissue in the physiological cup; the last patient of this series showed a secondary atrophy of the optic nerve. This case had evidence of old ethmoidal infection, and there was a history of a previous positive Wassermann reaction, but two Wassermann reactions performed in the Johns Hopkins Hospital were negative, and the case was therefore included in the nasal sinus group and not in the syphilitic. The authors enter a plea for a more standard nomenclature in dealing with the optic inflammations and atrophies, advocating the employment of the term optic neuritis for cases where actual inflammation of the nerve head is present and reserving the term choked disc for cases where increased intra-cranial pressure is the cause of the fundus manifestation. If it be impossible to determine which cause is at work, then the term papilloedema meets the case; they would like to abolish the terms axial, ascending and descending neuritis, in order to clarify the terminology.

R.R.J.

(5) **Caldeira.—Primary tumours (intradural) of the optic nerve. (Tumores primitivos intradurales do nervo optico.)** Faculdade de Medicina e Chirurgia de Sao Paulo. 51 pp. with 8 plates. Sao Paulo, 1923.

(5) This little brochure is **Caldeira's** thesis presented and defended at the Medical and Surgical Faculty of Sao Paulo in March, 1923. The foundation of it is four cases observed since 1918, but the first 32 pages deal with the history, aetiology, pathological anatomy, symptomatology, topographical classification, prognosis

and treatment of the condition. In the historical section we were pleased to see a reference to Hudson's paper published in 1912.

The author's first case was in a boy, aged 7 years with very marked protrusion of the eye in a downward and outward direction; the proptosed eye was quite irreducible, there was no pulsation, and the eye was blind, the fundus examination showing a condition of post-neuritic atrophy. The eye and tumour were removed together, the tumour being found to extend right up to the apex of the orbit. The report was: a malignant soft glioma of the sheath, which had invaded the nerve proper, leading to atrophy of the same.

The second case occurred in a female patient, aged 39 years, with a long history of slowly increasing exophthalmos; the protrusion was not so marked as in the first case; the eye was blind and the fundus examination showed a temporal atrophy of the nerve head. The mass was removed with preservation of the globe according to the method of Lagrange, and the report was: glioma of the optic nerve.

The third case was in a female, aged 24 years. The eye was preserved in removing the tumour, and the diagnosis was: fibro-glioma of the optic nerve with central cyst of degeneration.

The fourth case appears from the photograph to have occurred in a little girl. The tumour was removed with preservation of the globe, but details in the text seem to be wanting.

R.R.J.

(6) **Vinsonneau, C. (Antwerp).—Retrobulbar optic neuritis and sphenoidal sinusitis. (Névrite optique rétro-bulbaire et sinusite sphénoïdale.)** *Arch. d'Ophtal.*, February, 1924.

(6) **Vinsonneau,** in discussing the question of sphenoidal sinusitis in connection with retrobulbar neuritis, gives no new facts of his own, and although he mentions several authorities gives no bibliography or references. He comes to the following conclusions: "(1) The pathological relationship of the antrum, sphenoidal sinus and nasal sinuses with the pathological state of the optic nerve is of daily observation and lends support to the conception: the sphenoidal sinus is frequently of aetiological importance in cases of acute retrobulbar neuritis. Nevertheless such frequency should not be considered an absolute rule if the clinical evolution of certain cases is duly followed up. There exist then two well defined pathological chapters: (*a*) functional disturbances of the optic nerve, and subacute and latent infection of the nasal fossae, sphenoidal sinus and antrum; (*b*) retrobulbar neuritis and sphenoidal sinusitis. (2) From the therapeutic point of view it is necessary to differentiate the sphenoiditis with retention but without infection from the severe sphenoiditis with retention and infection; the procedure to be followed is absolutely different in the two cases. It is to be

remembered that the success of intervention in the sphenoidal sinus is not a simple question of operative technique and that a relapse as a result of contraction of the opening frequently occurs. (3). The attention of the ophthalmologist should be drawn more and more to the research of an aetiology of nasal or naso-pharyngeal origin for the explanation of numerous cases in ocular pathology. From which we may conclude that, in what concerns the education of our students, we should insist more and more on the relations, both physiological and anatomical, between the orbit and its contents on the one hand, and the nasal fossae, antrum and adjoining sinuses on the other. Such bilateral education will bear fruit, provided that, at the same time, prudence in rhinological therapeutic diagnosis is taught to these future practitioners."

E.E.H.

(7) **Velter and Liebault.—Acute retro-bulbar neuritis: polypus of the sphenoidal sinus: removal: cure. (Névrite rétro-bulbaire aiguë: polype du sinus sphénoïdal: ablation: guérison.)** *Arch. d'Ophtal.*, March, 1923.

(7) **Velter** and **Liebault** report the case of a woman, aged 27, in whom an acute retro-bulbar optic neuritis (right-sided) with characteristic signs and symptoms, developed twelve days before she came under observation. Vision was almost abolished, "less than 1 per cent." A polypus "the size of a green pea" was removed from the right sphenoidal sinus on December 24. Improvement in the ocular condition began within three days, and by February 6, vision had recovered to 8/10, though a small relative central scotoma persisted.

J. B. LAWFORD.

III.—MISCELLANEOUS

(1) **Contino, Prof. A. (Sassari).—Histogenesis of molluscum contagiosum of the lids. (Istogenesi del mollusco contagioso delle palpebre.)** *Annal. di Ottal. e Clin. Ocul.*, June-July-August, 1923.

(1) **Contino** refers to the theory advanced by Virchow, and supported by many famous pathologists, of the origin of molluscum contagiosum in the sebaceous glands of hair follicles, and to the opposed theory of its origin from cutaneous epithelium. As refuting the sebaceous gland theory, he quotes the unique case

described by Ballaban, of molluscum on the bulbar conjunctiva, where there are no sebaceous glands.

For several years the author, whenever he has come across multiple small mollusca of the lids, has excised them, stained them in bulk, and cut serial sections. He has also made a considerable number of wax models from the sections. As a result of his observations he states that molluscum contagiosum consists essentially in a hyperplasia of the cutaneous epithelium, due to a specific agent which stimulates the proliferation of the germinal layer of the epithelium, and also produces changes in the newly-formed cells, which, together with their physiological tendency to keratinization, are the cause of the formation of the molluscum bodies.

Keratinization of the epithelial cells is an indispensable factor in the formation of molluscum bodies, and, therefore, molluscum contagiosum can only occur where there is epithelium which normally undergoes keratinization, namely skin epithelium, including that invaginated to form the openings of hair follicles and sweat glands. Ballaban's case, mentioned above, he attributes to the existence of a congenital island of skin epithelium on the bulbar conjunctiva. In more than a third of the cases examined, the opening of the molluscum was in common with that of a hair follicle. This he explains by suggesting that the opening of the hair follicle affords a ready nidus for the virus. As the molluscum grows the hair follicle is displaced, and atrophies, and in large mollusca a small column of epithelial cells, protruding from the epithelial mantle which surrounds the aperture, represents the last remnant of a hair follicle, and can be recognized by the difference of its cells from those of the molluscum.

In his researches he finds that the first histological alteration in the epithelium, which indicates that a molluscum is about to form, is a circumscribed proliferation of the cells of the germinal layer, becoming a bud or a column which becomes buried in the derma. The newly-formed epithelial bud is distinguished from the surrounding inter-papillary epithelial columns not so much by its shape as by its peculiar structure and the changes which, even in the earliest stages, occur in its constituent cells, and by a more or less marked small-cell infiltration of the surrounding derma.

The author publishes eighteen micro-photographs, the first of which shows a very early, and so far undescribed, stage of molluscum. It is a globular mass of cells measuring 80 $\mu \times 90\mu$, buried in the apex of a dermal papilla. The basal layer of the epithelium, when it passes on to the molluscum bud, changes in character, the cells having more cytoplasm, and an obvious nucleus with evident chromoplasm. The change is more evident at the superficial part of the bud, giving the impression that the bud arises from the layer of cells immediately above the basal

layer. Within the bud, in contact with the germinal layer, there are large vesicular cells, some of which have a deeply staining globule alongside the nucleus. This is the first stage in the formation of a molluscum body. In the middle of the mass there are two small rounded cavities, the larger of which contains two wrinkled cells, which show better the characteristic corpuscle. The skin papilla, in which the mass is embedded, shows a slight inflammatory infiltration. The author remarks that this description shows the molluscum body to be a very early manifestation in the development of molluscum contagiosum. Other preparations of later stages show swollen cells, which become shrunken, not only the cell body, but also the nucleus, becoming wrinkled. As the cells shrink, one or more deeply staining bodies appear alongside the nucleus. These cells show fine granules of kerato-hyalin. The author emphasizes the inflammatory reaction in the surrounding tissues, which he regards as a defence against the specific toxin rather than due to mechanical irritation by the tumour. He describes in minute detail other preparations showing every stage up to the fully formed molluscum. He concludes that there are three stages in the cell changes: first, swelling and hydrolysis of the endoplasm; second, gelatinization of the endoplasm, giving the appearance of molluscum bodies; and third, their complete keratinization. He finds no evidence of micro-organisms. He gives a bibliography.

A. D. GRIFFITH.

(2) **Bettin, Mona E. (Los Angeles.)—Report of a case of torula infection.** *California and Western Medicine,* March, 1924.

(2) The torula is a wild yeast, it does not form spores nor does it ferment sugars. It does not produce mycelium either in cultures or in the tissues. It appears to have a predilection for the central nervous system and does not give rise to a general infection. Cases of torula infection in human beings were reported by Stoddard and Cutler in 1916 from the Rockfeller Institute. They had two cases and found records of four others in the literature. A case was reported by Pierson of San Francisco in 1917, and Evans of Loma Linda reported two in 1922. The patient whose case forms the basis of this paper was ill for many months with symptoms of encephalitis. The spinal fluid showed numerous yeast-like organisms which proved to belong to the torula group. A chronic meningitis was found at the autopsy with lesions in the optic thalami and an abscess at the base of the right lung.

The case occurred in a nurse, aged 40 years, who complained of very severe generalized headaches which had been constant and which were increasing in severity; symptoms had been complained

of in the summer of 1922, and at the same time there had been a discharge from one of the ears, but after a holiday matters had improved somewhat, and it was not until about six weeks before she came under her doctor's care in December, 1922, that the headaches, which had been intermittent at the first, became constant. Vomiting was also present at this time, but no other subjective neurological symptoms. There had been no rise of temperature at any time. Bettin found a very stiff neck, painful on attempts at flexion and rotation; Kernig's sign was present, the deep and superficial reflexes were slightly increased, the pupils mid-wide and active to light and convergence. There was no clonus or Babinski, no history of sphincter trouble and no cranial nerve involvement, the fundus was normal, the retinal veins showing, perhaps, an unusual fullness. Lumbar puncture gave a clear fluid under considerable pressure; no acid-fast organisms were present and the Wassermann reaction was negative.

The patient grew worse, the headaches became more intense, vomiting was of frequent occurrence and the temperature ranged between 98° and 102° F. After a few days there was a remission, but a relapse soon followed and, shortly after this relapse the patient complained of cloudy vision and a moderate neuro-retinitis was noted; blindness quickly supervened, without any marked change in the fundus picture being observed. Attempts at lumbar puncture failed on account of the extreme spasm of the lumbar muscles and the hyperextension of the spine, but as the patient became more stuporose complete relaxation with loss of reflexes made it possible for a puncture to be done, and the fluid drawn off was found to be opaque, whitish in colour, with evidence of suspension in it of some foreign substance which proved to be yeast.

A full account is given of the laboratory findings and the post-mortem findings, with pictures of a section of the brain showing the torula organisms, also the spinal fluid showing the same, and a culture slide. The author places the initial lesion probably in the lung; the case was discussed by Pierson and Evans.

R.R.J.

(3) **Klainguti, R.—Colour sense disturbance in retinitis pigmentosa and total colour blindness. (Farbensinnesstörungen bei Retinitis pigmentosa und totale Farbenblindheit.)** Univ.-Augenklin., Zürich. abs. ***Zentralbl. f. d. gesamte Ophthal.***, March, 1924.

(3) **Klainguti** records a family where four of the children suffered from retinitis pigmentosa and a colour sense disturbance

amounting to what seemed a total colour blindness. The great-grandmothers of the family were sisters. Examination was made of the mother and one of her sisters as well as of the four affected children. So far as could be ascertained the remaining children and the father were normal. The four children are minutely described. Coarse and fine nystagmus was present, and the visual acuity was 3/60—6/24. Optic discs were grey and the periphery of the fundus was marble grey.. Pigment spots were present round the vessels, and in one case there were white spots. Field of vision was contracted down 20°-30°, up to 50°. Dark adaptation was reduced. In two cases the Wassermann reaction was negative.

Colour Tests. None were recognized (Stilling) except the first two red-greens, and the simulation tests. In the spectrum, the red and violet ends were shortened, with the most luminous area in the yellow, next in the orange-red and next in the light green. In the wool tests those dyed deeply were placed together fairly correctly but with hesitation. Otherwise there was more or less striking confusion between red and yellow, green and blue. In single colours of a highly different degree these were partly placed together correctly. The colour sense disturbance differs from that of the totally colour blind in the inability of the latter to recognize even the deeply dyed samples. With regard to the difference in the naming of the most luminous part of the spectrum (in the total colour-blind this is at 520 $\mu\mu$), the total colour-blind hesitated to name the colours, while the retinitis pigmentosa cases did, even when they made mistakes. In the latter also the typical photophobia was absent, and the nystagmus was coarser, except in the youngest. Hence it is thought that there is a disturbance of colour sense produced by the retinitis pigmentosa. It is suggested that this would be more frequently found if more exact examinations were made. The suggestion of the coupling together of retinitis pigmentosa and total colour-blindness is set aside, especially on account of the difference of the ascertained colour disturbance from that of the typical monochromasia.

S. SPENCE MEIGHAN.

(4) **Cottle, Maurice H. (Chicago).—Post-operative adhesions of the vitreous to the cornea.** *Amer. Jl. of Ophthal.*, April, 1924.

(4) **Cottle** having noted that references to this condition are very rare, proceeded to make a series of slit-lamp examinations of cases where an intraocular operation had been performed. He gives details of four such cases. In the first, after a discission for secondary cataract, threads of vitreous could be seen coming through the hole in the capsule to be attached to the corneal wound. Cauterization of the latter brought about healing and disappearance of the threads.

In the second, a spontaneous haemorrhage had occurred into the anterior chamber after various operative procedures, and the haemorrhage was seen to occupy the upper part of the chamber; slit-lamp examination revealed a prolapse of vitreous, with blood on its upper surface.

In the third, following discission, the pupil was found to be horizontally oval, owing to the traction exerted by two bands of vitreous coming forward through the pupil to the two needle wounds in the cornea.

In the fourth, irregularity of the pupil following cataract extraction and iridotomy was found to be due to vitreous adhesions.

These adhesions vary in structure, some being fine threads, others large tough yellowish fibres. They have no tendency to disappear spontaneously, and in one case had been present for nineteen years. Where there is a fluid vitreous, formation of adhesions is impossible, and with a normal vitreous they are found only when the site of the corneal wound is an appreciable distance centrally from the limbus.

F. A. WILLIAMSON-NOBLE.

(5) **Majewski, K. W. (Cracow).—On a case of spastic pseudomyopia. (Sur un cas de pseudomyopie spastique.)** *Rev. Gén. d'Ophtal.*, October, 1923.

(5) **Majewski** relates a really extraordinary case of persistent, constant (in the sense of unvarying) pseudomyopia of seven dioptres in a practically emmetropic male patient whom he has kept under observation for the long period of twenty years or so; in fact, from the patient's age of twenty-five years till the onset of presbyopia and relaxation of the ciliary spasm at the age of forty-five years. The patient's history pointed to early commencement of the myopia, though the first glasses were not prescribed until his sixteenth year. Majewski has apparently waited all this time before publishing in order to see what would happen after the lapse of years, when, in the nature of things, the ciliary muscle would be obliged to give up the contest. Repeated atropinization in this case always yielded the same result, namely, some half dioptre of hypermetropic astigmatism with the rule. An attempt was made at first to overcome the spasm by prolonged use of the cycloplegic and the wearing of plus glasses to enable the patient to carry on his work. As the patient presented absolutely no symptoms other than inability to see at a distance and as the atropin was, of course, a source of much inconvenience to him, this attempt had to be abandoned and the patient allowed to continue on his way. During the twenty years repeated examinations were made under cycloplegics and these invariably gave the same result, and invariably the spasm returned to exactly the same

amount as before. At the age of forty-five years the patient was found to have given up the use of glasses and to have a visual acuity unaided of 6/8 binocularly. The visual acuity of the right eye was 6/18 and with −1.5 D.sph., 6/6. That of the left eye was 6/12 and with —0.50 D.sph., 6/6. When homatropin was instilled the result came out exactly as it had done twenty years previously. The author has not been able to find in the literature any precisely similar case. His subsequent remarks are mainly concerned, as one would anticipate, with the bearing of this case (in which the eyes had been quite undamaged after twenty years of ciliary spasm) on the near vision theory of the causation of myopia. The reviewer would remark, however, that this is only one case, and although Majewski suggests that numerous similar cases may be missed by ophthalmic surgeons through not using a cycloplegic he is unable to consider that this is probable. The attention drawn to the matter may perhaps bring similar cases to the memory of other observers.

ERNEST THOMSON.

(6) **Krekler, Ferdinand (Würzburg).—The structure of the sclera at different periods of life. (Die Struktur der Sklera in den verschiedenen Lebensaltern)** *Arch. f. Augenheilk.*, Vol. XCIII, September, 1923.

(6) The comparatively scant attention that the histology of the sclera has received and the conflicting findings of previous observers led **Krekler** to the investigation in question. The material for the research was obtained mainly from the cadaver, and to a small extent from operations. In most cases only the posterior segment of the globe was available. After fixation with formol the segments were sectioned on the freezing microtome, 20 μ being the constant thickness of the section. As far as possible the cutting was done through the macular region and the optic nerve entrance. Great care was taken to obtain the flat sections which are indispensable for the proper study of the sclera. No embedding was done as both celloidin and, to a less extent, paraffin are unfavourable to proper tinting of elastic fibres. Weigert's resorcin-fuchsin mixture was the stain exclusively employed. The sections were stained from 3-5 minutes, and well washed in alcohol; a few drops of concentrated solution of picric acid added to the alcohol differentiated the connective tissue which it coloured distinctly yellow. Some were coloured with haematoxylin, and sclerae of advanced age were stained in particular with scharlach red for fat.

Of the 56 eyes examined, 35 came from cadavers of individuals over 60 years of age. For comparison the material is grouped into

scleral tissue of (1) the young up to the 20th year; (2) middle age from 20th to 60th year; (3) old age from 60 upwards. Of young eyes examined several were from the new-born. The development of the sclera appears incomplete at this stage of life, the paucity of elastic fibres in particular, which occur mainly in the posterior segment of the globe, is noticeable. Already in the first months of infancy the histological picture seems to change rapidly, the marked increase in elastic fibres uniformly distributed among all the layers of the sclera becomes obvious at a glance. The sclerae best suited for a satisfactory study of the course of the fibres are of young eyes until the end of the second decade of life. In this period the elastic fibres are not yet prominent in the scleral ring; the scleral tissue proper is yielding and translucent; it is relatively rich in cells which are large owing to their being not yet compressed and flattened; its fibrillary structure is not yet obvious; that the tissue is loose is shown by the marked wavy course of the bundles; the elastic fibres have hardly any tendency to undulation and pass straight over the waves of connective tissue.

In middle age the surprisingly large number of elastic fibres in the sclera is found unequally distributed among the lamellae. The amount of elastic fibres in the episclera remains about the same, in the sclera proper slightly diminished, more obviously in the anterior than in the posterior segment of the globe. The richness in elastic fibres of the innermost layers of the sclera is striking; it appears as though the connective tissue fibres were spun round with a dense felt-work of elastic fibres. At the margin of and in the lamina cribrosa the wavy coarse elastic fibres so beset the picture as to constitute its salient feature as contrasted with the lamina cribrosa of the young eye. The equatorial region is comparatively poor and the posterior pole very rich in elastic fibres. The sclera itself is denser. The cells are flattened into spindles. The fibrillae are more evident. Under the age of 50, the reactions to stains and reagents for fat and calcium were invariably negative.

In the sclerae of individuals over 60, Krekler paid particular attention to the quantitative estimation of elastic fibres. He came to the conclusion that in old age neither increase nor decrease in them could be made out. Individual fibres show no obvious regressive changes beyond an increase of volume here and there. The equatorial region shows even greater poverty in elastic fibres than in middle age. The posterior segment of the globe, particularly the posterior pole and the neighbourhood of the optic disc shows no variation of distribution of elastic fibres. On the other hand, the connective tissue fibre of the sclera in old age becomes considerably changed. The increase of density noticed in middle age becomes more pronounced and there is a further diminution of connective tissue cells. The most striking changes consist in deposits of fat and

chalk between the connective tissue fibrillae. The initial seat of predilection for the deposits is the equatorial region; later the whole sclera becomes involved, sometimes appearing as though it had undergone fatty change in its entirety; invariably the inner lamellae are predominantly affected, the outer remaining comparatively free. Often even the lamina elastica of the choroid is strongly tinted by Sudan red. The calcic deposit is mostly in the form of phosphate.

The findings of this histological research are helpful in explaining the mechanical function of the sclera. The call for firmness, extensibility and elasticity in the sclera is answered by the intimate mixture of the tough connective tissue fibres with the elastic fibres. Contrary to the view of some authors even the connective tissue fibres are extensile in certain measure. The regressive changes, particularly deposition of fat and chalk, in the connective tissue in advanced years and consequent increased rigidity of the sclera in spite of the elastic fibres remaining undiminished and unchanged, are, in the opinion of Krekler, of significance in certain diseases of the eye, particularly glaucoma.

D. V. GIRI.

(7) **de Lapersonne, S. (Paris).—Orbital tumour of mixed characters. (Tumeur mixte de l'Orbite.)** *Arch. d'Ophtal.*, August, 1923.

(7) The patient, a female, aged 41 years, had had signs of orbital tumour for seven years, and when she came under observation in October, 1922, exhibited a very large growth in the right orbit, projecting more than 3 cm. Radiography showed that the orbit was completely filled by an osseous mass of pyramidal shape, covered anteriorly by a soft lobulated growth. The anterior, soft, portion of the tumour with the eyeball and stretched optic nerve was removed *en masse*, and the osteoma was subsequently extirpated without much difficulty.

Seven months later the condition of the patient and of the orbit was satisfactory.

The histological characters of the tumour were very varied. The bony portion which corresponded exactly to the shape and dimensions of the orbit, was composed of compact dense osseous tissue. In front of this was another growth "the size of a small nut" and ensheathed in cellular tissue; its consistence was less than that of the larger osteoma. The structure of the soft (extra-orbital) portion of the tumour varied greatly in different parts. Anteriorly the cells were large and fusiform, with long nuclei, staining deeply; they terminated in thin wavy fibrils, passing in all directions. In an adjoining portion the cellular elements were more closely set and gave an appearance of a fibroma, the cells

being long, fusiform and tapering, with one nucleus and sometimes two. The cells were arranged in close irregular columns, and an appearance of vortices was noticeable in the sections. In still a third zone were found all the characters of a fusiform-celled sarcoma, with newly formed blood vessels, in a finely fibrillated matrix. There were also, in this part, some giant myeloplaques and fine strands of unstriped muscle fibres. Striated muscle-fibres, evident in the peripheral parts, were derived from the ocular muscles.

J. B. LAWFORD.

(8) **Blatt, Nicolas (Roumania).—Clinical and pathological study of primary anthrax of the eyelids. (Klinik und Pathologie des primären Lidanthrax.)** *Arch. f. Ophthal.*, Vol. CXI, Leaflet 112, 1923.

(8) **Blatt** had the opportunity of observing ten patients in 1922 during an anthrax epidemic, of whom three presented a primary infection on the right upper lid. These three patients further presented very serious general symptoms. The infections of the eyelid presented peculiarities with regard to form and evolution. Whereas the other cases presented the typical characters of the malignant pustule, in the case of the eyelids there developed a diffuse, oedematous inflammation, because the loose skin and subcutaneous tissue offered insufficient opposition to the process of invasion. As a general rule four stages could be differentiated in the evolution of the disease. In the first stage one notes redness of the eyelid, with itching and a burning sensation, but without actual pain. The eyelid continues to swell. While general symptoms of alarming gravity develop, the pre-auricular and sub-maxillary lymphatic glands increase in size, and the oedema extends towards the temporal region and downwards over the face. The skin develops a livid hue. The second stage is characterized by the formation of necrosis in the superficial and deeper tissues of the eyelid, which takes the form of a dark-brown to deep-black slough. During the third stage the general symptoms begin to abate, while a purulent line of demarcation limits the sloughs. The slough is cast off, and there remains a deep loss of substance, with undermined and swollen edges. In the fourth stage the ulcer becomes cleaner, and finally closes by a process of cicatrization, or advances as the result of a moist gangrene which may extend to the bulb. The development of the pustule at the same place, that is the right upper lid, in the case of all three patients, is to be explained by the fact that they had all been occupied in skinning animals that had died from anthrax, and had been stung by the flies that swarmed about them. The infectious material originated in the blood of the dead animals, which in the first case spurted on to the patient's eye, and in the

perspiration on their brows and eyelids. As the patients applied early for medical help it was possible to determine accurately the period of incubation, which was four days in the two first cases and five days in the third. In spite of the deep anatomical changes the functional results were fairly satisfactory. The eyelids retained their normal position and their movements were but little diminished. The absence of ectropion was accounted for by the fact that the scarring extended deeply into the subconjunctival tissue at the line of reflection and even to the periosteum. One case developed panophthalmitis. The general treatment is purely symptomatic. The author tried intravenous injections of neosalvarsan, and is convinced of the efficacy of this treatment, so far as the general state is concerned. The local manifestations do not seem to be affected by neosalvarsan. The local treatment must be entirely conservative, moist compresses and fomentations with weak mercurial lotions.

V. ST. JOHN.

(9) **van Duyse, D. (Ghent), and Moret (Charleroi).—Pseudo-osteoma of the orbit (fibro-myo-lipo-épithelioma with calcification) and epithelial-osteoma of the temporal fossa, contiguous to the great wing of the sphenoid. (Pseudo-ostéome de l'orbit [fibro-myo-lipo-épithéliome calcifié] et epithélio-ostéome de la fosse temporale, attenant au niveau de la grande aile du sphénoïde.)** *Arch. d'Ophtal.*, March, 1924.

(9) **van Duyse** and **Moret** report their case in detail and the histological findings are illustrated by several microphotographs. Apart from the interest of the case in relation to the development and nature of the neoplasm, a notable feature was the calcification of the orbital growth. This had occurred so extensively that an X-ray examination seemed to render a diagnosis of a bony growth in the orbit almost a certainty. The patient was a female, aged 32 years, in whom the first symptom (proptosis) was noticed only three months before she came under observation.

When seen by van Duyse the exophthalmos was well marked, but there was an entire absence of congestion, paralysis of nerves, papilloedema, pulsation or bruit.

The growths were removed from the temporal side after resection of the zygomatic arch. In spite of the severity of the operation, necessitating exposure of the intracranial cavity close to the outer margin of the cavernous sinus and resection of the wing of the sphenoid, the recovery was uninterrupted and rapid, the patient leaving the hospital at the end of a fortnight.

The new growth in the orbit had very varied histological characters, and the authors call it fibro-myo-lipo-epithelioma. It was rich in fibrillated tissue, and in parts showed muscular and fatty

tissue, and spaces filled by epitheliomatous cells. The tumour of the temporal fossa, which was contiguous to the orbital growth, consisted largely of osseous tissue, in which were irregular cavities; these were surrounded by concentric bony lamellae; in places a line of osteoblasts extended the length of the lamella to the alveolus. At the periphery of these alveoli was a tissue composed of long loose fibres enclosing connective tissue elements and capillaries. The central part of the alveoli was occupied by a collection of flat epithelial cells, resembling the epithelial elements of the orbital tumour, but being less sharply edged.

An interesting discussion as to the pathogenesis of this unusual tumour follows the description of its clinical and histological characters.

J. B. LAWFORD.

IV.—INSTRUMENT

(1) **Cambridge Scientific Instrument Co.**—The Cambridge Ophthalmoscope.

(1) This ophthalmoscope is similar to that designed by the late Professor Wertheim Salomonson.* Various modifications have been made in the design, but the optical system is essentially the same. By means of the apparatus it is possible to obtain photographs of the fundus about 44 mm. in diameter, covering a very large proportion of the total fundus and enabling both the disc and yellow spot to be shown on one plate; the plates produced are capable of considerable enlargement.

The ophthalmoscope consists of two optical systems, one being used for illuminating and the other for viewing and photographing the fundus. A beam of light from a small arc lamp passes through a condenser and a lens and forms an image of the condenser in the plane of an aplanatic-aspheric lens; this illuminating beam is in turn reflected into the eye. The fundus is viewed by means of an eye-piece; to photograph the retina, this eye-piece is conveniently and quickly replaced by a photographic plate. Before photographing it is necessary to focus the image; this can only be done if the intensity of light has been much reduced, as the patient would not be able to suffer the prolonged action of so strong a light. To overcome this difficulty, the instantaneous shutter, with which the instrument is fitted, is placed in front of the prism in the illuminating tube. When in the position of

Transactions of the Optical Society, Vol. XXII, p. 53, 1920-1921.

being set, the shutter presents an opening covered with aluminium foil perforated with a number of tiny holes, through which enough light passes to enable the operator to examine carefully the fundus and focus the image, at the same time causing the patient no discomfort. The exposure of the full beam of light may be varied from 1/20 to 1/5 of a second; in practice it will be found that an

exposure of 1/10 of a second will generally suffice. Owing to the careful design of the optical system, all secondary reflections from the ophthalmoscope lens and cornea are eliminated. Provision is made whereby the ordinary lenses used for astigmatism can be placed in a standard clip in front of the ophthalmoscope lens. The whole instrument is mounted on a bench, and is capable of adjustment in three directions in order that it can be carefully adjusted into close proximity to the eye under observation. A

novel arrangement enables the whole instrument to be swung through an angle of 180 degrees without removing it from the base, thus rendering it possible to obtain photographs of the retina of either the left or the right eye easily and quickly.

BOOK NOTICES

Transactions of the American Ophthalmological Society. Vol. XXI, 1923. 327 pp. 25 plates, 3 coloured. Philadelphia, 1923.

This volume of the transactions of the American Ophthalmological Society deals with the fifty-ninth Annual Meeting held at Colorado Springs, Col., 1923. The matter is well up to the usual standard, both papers and discussions being of considerable interest. Some of the papers have already been noticed in this journal and we hope to publish further abstracts later. The appendix contains the report of a committee on graduate teaching of ophthalmology (Edward Jackson, chairman, F. H. Verhoeff and T. B. Holloway), which those engaged in teaching the subject would do well to study. One sentence might well be written up over the entrance to the clinic: "The perfection of a graduate education is attained not by telling or showing the student something, but by training him to see and do it himself."

Reports of the Ophthalmological Hospital of Buenos Aires. Vol. VI, 1923. (**Communicaciones del Hospital Oftalmologico, Buenos Aires**). Sociedad de Beneficencia de la Capital.

This brochure of 107 pages is the sixth volume of reports issued by the Ophthalmic Hospital of Buenos Aires. It consists of three sections. The first, and by far the largest, is occupied by the original papers; the second gives an abstract of the session of the Ophthalmological Society of Buenos Aires for the year 1923, and the last consists of reviews of subjects of ophthalmological interest from the Argentine medical papers. There is also an account of the opening of the new Ophthalmic Hospital of Santa Lucia. The original papers number only seven; Soriano has a long communication on colour vision and its anomalies. Marque and Oyenard, a short account of a case of amaurotic family idiocy in the family of a Russian Jew and Jewess, with a good coloured plate. Oyenard deals with the frequency of granular lids in Buenos Aires. Echavarria writes on the ocular complications of sinusitis. Androgué has three papers: one on tobacco-alcohol amblyopia, and the other

on cholesterin crystals in the anterior chamber, and the last on a case of retinitis pigmentosa *sine pigmento*. The brochure is very well printed and got up, and the illustrations are excellent; the high standard set in the previous volumes is fully maintained.

Ophthalmic Service of the Department of Health, Government of Palestine. Annual Report, 1923.

The ophthalmic conditions in some parts of Palestine are not much better than those which formerly existed in Egypt, and this was realized some years ago by the Director of Health, Major G. W. Heron, D.S.O., who organized a travelling ophthalmic hospital for the country districts. This was in charge of a British ophthalmic surgeon, with Palestinian medical officers, who, after obtaining their professional qualifications, received a period of ophthalmic training at the Egyptian Ophthalmic Hospitals.

In previous annual reports Major Heron has described the large amount of work carried on at the travelling hospital, which was started in 1919. It is extremely disappointing to learn that during last year, for reasons of economy, the hospital was suppressed. This policy is the reverse of far seeing, besides being unsound economically. In Egypt suppression of ophthalmic hospitals for the sake of economy was occasionally suggested, but was successfully resisted by the late Director of Ophthalmic Hospitals, with the result that their beneficent work of a highly popular character has made much easier the task of the other public health authorities, when striving to carry through schemes of sanitary importance, but without popular features. It is unsound, economically, to suppress an institution which is combating the causes of blindness, and which can never be satisfactorily replaced by ophthalmic clinics carried on in hired premises. It is greatly to be hoped that the Department of Health will have restored to its budget a sufficient sum to maintain adequately the travelling hospital.

After the closing of the hospital special attention is said to have been given to the development of ophthalmic clinics at Jerusalem, Hebron, Ramallah, Beersheba, Jaffa, Ramleh, Gaza, Beisan, Nablus, Haifa, Acre, and Tulkarem. In the absence, however, of any mention of the number of patients treated at any of these places except Nablus we are inclined to the belief that the development of the majority of them is a pious hope which has not yet materialized. The clinic at Nablus has shown the greatest activity and was attended by 10,000 new cases.

Special courses of instruction for the personnel of the clinics were held at Nablus and later at Jerusalem. The training of the medical officers which was formerly carried out in Cairo is now being carried out at the British Ophthalmic Hospital at Jerusalem.

Annual Report of the Government Ophthalmic Hospital, Madras, for the year 1923. Madras. Printed by the Superintendent, Government Press. 1924. Price, 1 rupee, 2 annas.

The mass of carefully recorded statistics in these reports, with the remarks of the Superintendent thereon always represent a very valuable contribution to ophthalmic literature.

Major Wright, the Superintendent of the Hospital, was on leave for eight months of the year under review, and Captain P. Verdon was acting for him.

The work done shows a steady increase. 21,575 out-patients and 4,096 in-patients were treated during the year. 3,975 operations were performed, 1,613 being for senile cataract. The ordinary Madras operation with capsulotomy was employed in 1,452 cases; nearly 95 per cent. of the patients obtained better vision than 2/60, whilst 88.98 per cent. obtained 6/36 or better. Vitreous loss occurred in 1.23 per cent.; a remarkably good record when one considers the type of patient dealt with. Two cases of suppurative panophthalmitis and one case of expulsive haemorrhage occurred in the series.

The simple operation was performed upon 336 patients, the rate of iris prolapse being 12.7 per cent. A peripheral iridectomy was made after delivery of the lens in 376 selected patients with a rate of 1.8 per cent., and a complete iridectomy in 740 cases with a rate of 2.7 per cent.

The advantage of a preliminary capsulotomy with a Bowman's needle is again noted.

A special record of late infections after sclero-corneal trephining has been kept, and this trouble was met with three times since 1921; 471 trephinings were performed during the same period. Late infection after cataract extraction was noted in six cases; 3,079 operations having been performed.

Only one case of sympathetic ophthalmitis occurred among 44 patients who might reasonably have been expected to develop the disease.

One hundred and eighteen patients were trephined for primary glaucoma. The vision was improved and the tension was lowered in 35; the tension only was lowered in 77; and no improvement occurred in six.

Nineteen cases of chronic glaucoma were operated upon by Herbert's wedge isolation method. The tension was reduced in fifteen; "partially lowered" in two; and was unaffected in two. Vision was improved in five cases; and in the others remained the same.

Seventy cases of keratomalacia were recorded during the year. The substitution of sardine oil for cod-liver oil was tried in the treatment of the disease, but this proved unsatisfactory, since it tended to produce diarrhoea.

Some cases of interest are recorded by members of the staff; and much information regarding the incidence of eye disease in South India may be obtained from the report.

CORRESPONDENCE

PRESCRIBING SPECTACLES

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—Mr. Percival, in his article on prescribing spectacles appearing in the May number of the Journal, states that "the periscopic effect is more desired in the horizontal direction." Consequently, he would prescribe a -6D cylinder if its axis were vertical, but not if the axis were horizontal. Is this objection to a horizontal cylinder well founded? In the case of a bank clerk who has to add up columns of figures, it is manifestly not. The same applies to book-keepers in general, clerks, dress fitters and others in occupations where vertical movements of the eyes are as common or commoner than lateral movements. But even with the mass of people, who wear glasses for reading, I am not sure that Mr. Percival is right. In reading a column of the newspaper, we make considerable vertical excursions of the eyeballs but only very small lateral ones, and even in ordinary books, the extent of the printed matter is more than one and a half times in depth what it is in width. Reading at a distance of 13 inches or 14 inches the head makes very little movement, and there seems no reason for believing that the eyeballs roll more from side to side than they do up and down. In glasses for outdoor use there is more to be said for Mr. Percival's view, but even here the bulk of the movements to get new direction are effected by the head rather than the eyes, and one is frequently looking up and down as well as sideways.

Yours truly,

J. H. TOMLINSON.

EGHAM.

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—Owing to the courtesy of Mr. Tomlinson I have been allowed to see his criticism of my paper. I fully admit that the criticism is just in some special cases such as bank clerks, but I adhere to the opinion I expressed for those one usually meets with.

I find that I take two seconds to read a line of this journal, so I have to make every two seconds a to and fro lateral movement, *i.e.*, a slow movement to the right followed by a rapid resilient, jerk to the left in order to start a new line. The length of these lines is about 11 cm., a distance occupied by 28 lines in height, so that the downward movement is in the first place unidirectional, and finally only 1/28 of the extent of the lateral movement in the same time. This is the reason why I maintain that when reading it is important that the rapid lateral movement should be made by the eyes, and the vertical depression should, when necessary, be attained by depression of the head.

I am, however, very grateful to Mr. Tomlinson for drawing attention to the special cases in which a rapid vertical movement is required.

Yours faithfully,

A. S. PERCIVAL.

CLASSIFICATION OF DISEASES OF THE CHOROID

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—In the September number of the *Brit. Jl. of Ophthal.*, you publish a paper by Mr. Hepburn on the "Classification of Diseases of the Choroid," in which he specially attacks my attempts at classification of diseases of the macula, for which he says: "There is no justification," and accuses me of "confusion of thought."

Mr. Hepburn's paper was read before the Ophthalmological Section of the Royal Society of Medicine, and in the discussion which followed I made a reply, which, whatever its merits, showed that I neither accepted his criticism nor agreed with his conclusions. The publication of his paper without my reply might lead your wider field of readers to suppose that there was no other side to the question. I should be glad, therefore, if you would publish this letter.

Mr. Hepburn claims that the classification of diseases of the fundus should be founded solely on a pathological basis, and I suppose he would extend this view to all other structures of the eye, and elsewhere—a high ideal, but not very helpful to the clinician.

As clinicians, our main object must be to find out the cause of the clinical manifestation that we observe, rather than to bring it under one of the pathological headings Mr. Hepburn suggests. Of course, it is desirable that we should recognize a "typical inflammatory scar" as such; but what is of far more importance is that we should be able to determine, either by position or other characters of the lesion, the probable cause of the inflammation.

I wonder at Mr. Hepburn making the statement that: "Fundus diseases ought to be classified according to the structure in which they occur, either retina or choroid, as *both these structures are present in all parts of the fundus.*" If a mere clinician had made this statement, I should have expected him to be promptly called to order for his ignorance of the fact that, while the retina, for instance, covers the fundus, it differs in structure, vascular supply, and function, in its various zones; and the same may, I believe, be said of the choroid to a lesser extent.

Mr. Hepburn objects to the classification of lesions by their locality. But surely in this he is depriving us of a valuable aid to diagnosis of the cause of the disease. Not only in eye diseases, but in general medicine, the locality or structure picked out by certain toxins or drugs, is one of our important aids to diagnosis, and the symmetry or the one-sidedness of the lesion is often a determining factor. It is an absorbing question, this selection of certains cells or structures by different drugs, toxins, or microbes, for their manifestation, and one which I do not think even pathologists are prepared to answer.

Mr. Hepburn strikes me as ungrateful to the ophthalmoscopic observer, when he considers classification based on ophthalmoscopic examination as "a relic of the past," and it seems to me that the ophthalmoscopic observer can still—like the fool—ask more questions than the wise pathologist can answer.

In reply to Mr. Hepburn at the meeting of the Section, in justifying my claim for a special place for the classification of disease of the macula as an entity, after summarizing some of the anatomical, physiological and pathological peculiarities of the macula, I limited myself to two points—demonstrating them by numerous ophthalmoscopic pictures—which, if conceded, would in my view establish my claim for a classification of macula diseases as such.

These points were:

1. The extraordinary *symmetry* of true macula disease due to constitutional diseases, which appears to be almost a constant characteristic.

2. The establishment of *cerebral* macula disease as a definite entity.

If these two points be conceded, I fail to see how it can be held that other groups, such as septic, toxic and cardio-vascular, may not exist.

If it were a question of classifying the human race, Mr. Hepburn would, presumably, do it by *colour*—black, white, yellow, etc. But would it show "confusion of thought" if another man did it by *locality*, speaking of Africans, Europeans, Chinese and Japanese, etc.? The colour classification may be the wider, but it does not deprive the geographical classification of its value. As a matter of fact, both are necessary. It is just as important to know the kind of man one may expect in China or Japan, as to recognize the characteristics of a yellow man when one meets him in the street. There is surely room, and need, for an anatomical, physiological basis of classification as well as a pathological, without showing any confusion of thought or casting "a distinct slur" on Mr. Hepburn and his fellow-pathologists.

Yours faithfully,

RAYNER D. BATTEN.

LONDON.

NOTES

M.P.

SIR GEORGE BERRY has been re-elected Member of Parliament for Edinburgh and St. Andrews Universities.

* * * * *

Course on Slit-Lamp Microscopy of the Living Eye

A COURSE upon the use of the slit-lamp is to be given at the Oxford Eye Hospital on December 19, 20, 22, and 23.

The course, which will be under the general direction of Mr. P. Adams, Reader in Ophthalmology at Oxford University, will be modelled upon that given by Professor Vogt at Zürich.

The lectures will be given by Mr. Harrison Butler. Owing to the kindness of Messrs. Zeiss, eight slit-lamps will be at the disposal of the Hospital. Dr. Franceschetti, First Assistant to Professor Vogt, has accepted an invitation to act as Demonstrator.

The other demonstrators will all be Zürich trained. The number of students is limited to twenty-seven. The fee will be adjusted to pay the expenses of the course, but it is not anticipated that it will exceed £4.

* * * * *

Convention of English-speaking Ophthalmological Societies

A PRELIMINARY bulletin of the Convention of English-Speaking Ophthalmological Societies, July, 1925, will shortly be issued to the members of such Societies and Associations. It will contain a detachable slip which those wishing to become members of the Convention are asked to fill in and send to the secretary of the Finance and Registration Committee, Mr. Leslie Paton, 29, Harley Street, London, W.1., as soon as possible.

The registration fee for those who are not members of the Ophthalmological Society of the United Kingdom will be £2, and for ladies accompanying members of the Convention who wish to become associate members 10s. Each member of the Convention will receive a copy of its Transactions when published.

The following selected speakers will take part in the symposium: "On the evolution of binocular vision," Sir Charles Sherrington, O.M., P.R.S.; Sir Arthur Keith, F.R.S.; Sir Frederick Mott, K.B.E., F.R.S.; Prof. Elliot Smith, F.R.S.; Prof. S. E. Whitnall (Montreal).

The discussion on "Microscopy of the Living Eye," will be opened by Dr. Gordon Byers (Montreal); Mr. Harrison Butler (Birmingham); Dr. Arthur J. Bedell (Albany); and Mr. Basil Graves (London). Those wishing to take part in this discussion, to read papers, to give demonstrations, or to contribute exhibits to the Museum, are requested to communicate with the secretary of the Scientific Business Committee, Mr. R. Foster Moore, 91, Harley Street, London, W.1.

On the evening of Monday, July 13, before the opening of the Convention, a reception will be held at the Royal College of Surgeons of England. On Saturday, July 18, at the conclusion of the Convention, there will be excursions to Oxford and Cambridge.

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Errata

IN the Report to the Lang Clinical Research Committee in the November number, on page 535, 28th line, read "there" for they; page 539, paragraph commencing "March 25," 7th line, read "Fig. 17" for Fig. 19; page 543, 7th line from top, read "loth" for also.

FUTURE ARRANGEMENTS

1924.

December 12.—Section of Ophthalmology, Royal Society of Medicine (Clinical).

1925.

January 9.—Section of Ophthalmology, Royal Society of Medicine.

January 9.—North of England Ophthalmological Society at Bradford.

February 6.—North of England Ophthalmological Society, at Liverpool.

February 13.—Section of Ophthalmology, Royal Society of Medicine.

March 6.—North of England Ophthalmological Society, at Sheffield.

March 13.—Section of Ophthalmology, Royal Society of Medicine (Clinical).

May 8.—Section of Ophthalmology, Royal Society of Medicine.

May 11-14.—Congrès de la Société française d'Ophtalmologie, at Brussels.

June 12.—Section of Ophthalmology, Royal Society of Medicine (Annual).

July 14-17.—Convention of English Speaking Ophthalmological Societies, in London.

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